JVC

SERVICE MANUAL

COMPACT DISC PLAYER

MODEL No. XL-V220BK

COMPACT disc DIGITAL AUDIO

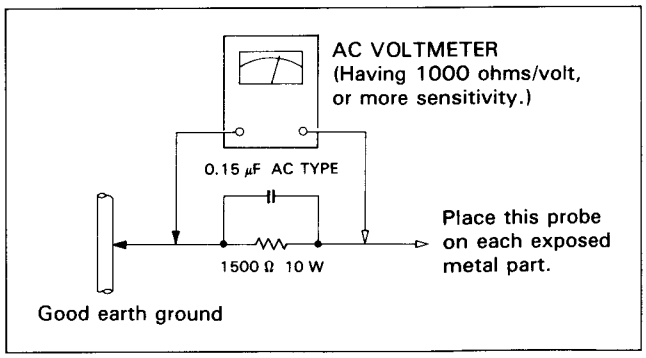
Contents

	Page
Safety Precautions	1-2
Important for Laser Products Instruction Book	
Block Diagram (Servo & Microcomputer Section)	1-3
(Audio & Power Souce Section)	1-5
Description of Major LSI ICs	1-7
Other LSI ICs and Internal Block Diagrams	1-12
Disassembly Procedures	1-16
LCD Panel Handling Precautions	1-17
Application Points for Grease	1-18
Timing Chart for TOC Reading	1-19
Maintenance of Laser Pickup	1-20
Adjustment Procedures	1-21
Important Waveforms	1-23
Troubleshooting	1-27
Schematic Diagrams	Insertion
Connection Diagram	1-35
Parts List	Separate-Volume Insertion

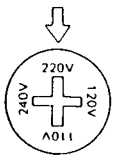
No. 2928
May 1986

Safety Precautions

1. The design of this product contains special hardware and many circuits and components specially for safety purposes.
   For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of the service manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in the service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in the service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
   When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage current check
   (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mV AC (r.m.s.).
   - Alternate check method.
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground. Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).


AC VOLTMETER
(Having 1000 ohms/volt, or more sensitivity.)
0.15 μF AC TYPE
1500 Ω 10 W
Place this probe on each exposed metal part.
Good earth ground

CHECKING YOUR LINE VOLTAGE (Except for U.S.A., Canada, Australia, U.K. and Continental Europe.)
Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located on the rear panel.
CAUTION: Before setting the "Voltage selector switch" to the proper voltage, disconnect the power plug.



Important for Laser Products

1. CLASS 1 LASER PRODUCT
2. DANGER: Invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to beam.
3. CAUTION: There are no serviceable parts inside the Laser Unit.
4. CAUTION: Do not disassemble the Laser Unit. Replace the complete Laser Unit if it malfunctions.
5. CAUTION: The compact disc player uses invisible laser radiation and is equipped with safety switches which prevent emission of radiation when the drawer is open and the safety interlocks have failed or are defeated. It is dangerous to defeat the safety switches.
6. CAUTION: If safety switches malfunction, the laser is able to function.
7. CAUTION. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

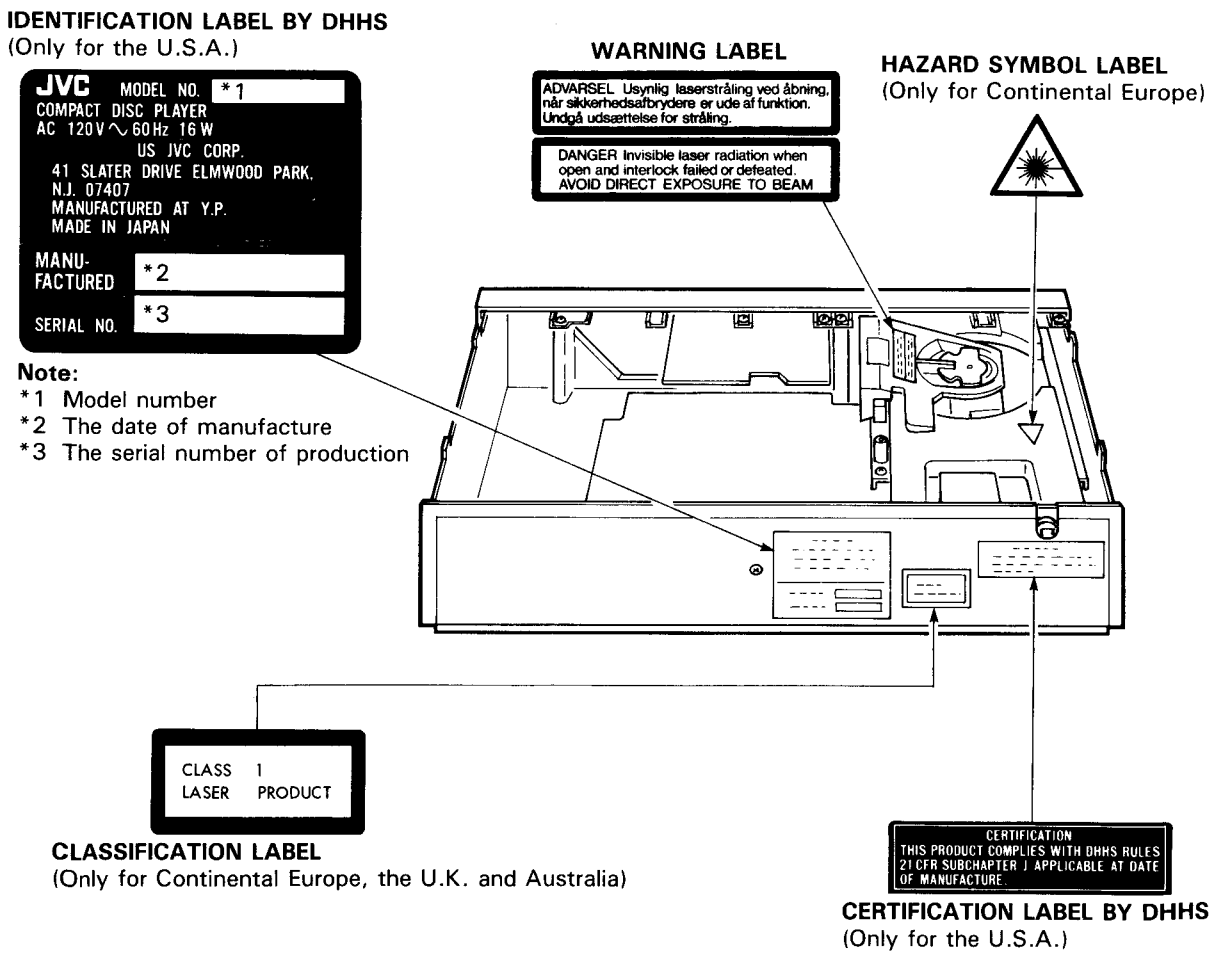
VARNING: OSYNLIG LASERSTRÅLNING UPPSTÅR VID KOMPONENTENS ÖPPNING NÄR SÄKERHETSBRYTAREN ÄR FRÅNSLAGEN.

ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.

ADVARSEL: USYNLIG LASERSTRÅLING VED ÅPNING NÅR SIKKERHETSBRYTEREN ER AVSLOTT.
UNNGÅ UTSETTELSE FOR STRÅLING.

VAROITUS: LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ (NÄKYMÄTÖNTÄ) SILMILLE VAARALLISTA LASERSÄTEILYÄ.

REPRODUCTION AND POSITION OF LABELS

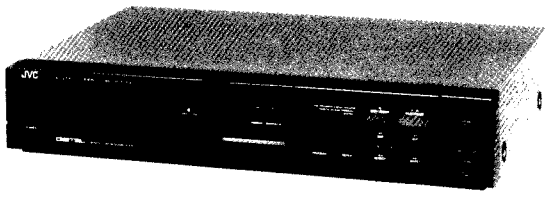

IDENTIFICATION LABEL BY DHHS
(Only for the U.S.A.)
JVC MODEL NO. *1
COMPACT DISC PLAYER
AC 120V ∿ 60Hz 16W
US JVC CORP.
41 SLATER DRIVE ELMWOOD PARK,
N.J. 07407
MANUFACTURED AT Y.P.
MADE IN JAPAN
MANU-FACTURED *2
SERIAL NO. *3
Note:
*1 Model number
*2 The date of manufacture
*3 The serial number of production
WARNING LABEL
ADVARSEL Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.
DANGER Invisible laser radiation when open and interlock failed or defeated. AVOID DIRECT EXPOSURE TO BEAM
HAZARD SYMBOL LABEL
(Only for Continental Europe)
CLASS 1
LASER PRODUCT
CLASSIFICATION LABEL
(Only for Continental Europe, the U.K. and Australia)
CERTIFICATION
THIS PRODUCT COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE.
CERTIFICATION LABEL BY DHHS
(Only for the U.S.A.)

JVC Instruction Book

COMPACT DISC PLAYER
XL-V220BK

BEDIENUNGSANLEITUNG: KOMPAKTPLATTEN-SPIELER
MANUEL D'INSTRUCTIONS: LECTEUR DE DISQUE AUDIONUMERIQUE
GEBRUIKSAANWIJZING: KONPAKT DISK-PLAYER
MANUAL DE INSTRUCCION: TOCADISCOS COMPACTO

COMPACT disc DIGITAL AUDIO



COMPU LINK Component

For Customer Use:
Enter below the Model No. and Serial No. which is located either on the rear, bottom or side of the cabinet. Retain this information for future reference.

Model No. _____

Serial No. _____

E30580-1326A

(No. 2928)

IMPORTANT (In the United Kingdom) Mains Supply (AC 240V~, 50 Hz only)

IMPORTANT

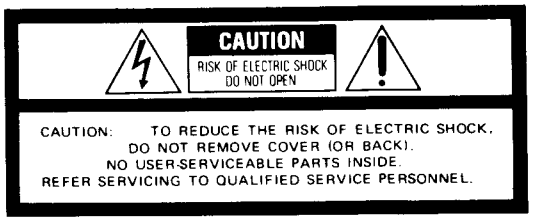
Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:

Blue to N(Neutral) or Black
Brown to L(Live) or Red

If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N(Neutral) or coloured Black.
Brown wire to terminal coded L(Live) or coloured Red.
If in doubt — consult a competent electrician.

THIS UNIT IS PRODUCED TO COMPLY WITH DIRECTIVE 82/499/EEC.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

INFORMATION (For U.S.A.)

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna;
Relocate this equipment with respect to the receiver;
Move this equipment away from the receiver;
Plug this equipment into a different outlet so that this equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No.004-000-00345-4.

CAUTION

To reduce the risk of electrical shocks, fire, etc.:
1. Do not remove screws, covers or cabinet.
2. Do not expose this appliance to rain or moisture.

ACHTUNG

Zur Verhinderung von elektrischen Schlägen, Brandgefahr usw.:
1. Keine Schrauben lösen oder Abdeckungen entfernen und nicht das Gehäuse öffnen.
2. Dieses Gerät weder Regen noch Feuchtigkeit aussetzen.

ATTENTION

Afin d'éviter tout risque d'électrocution, d'incendie etc.:
1. Ne pas enlever les vis ni les panneaux et ne pas ouvrir le coffret de l'appareil.
2. Ne pas exposer l'appareil à la pluie ni à l'humidité.

VOORZICHTIG

Ter vermindering van gevaar voor brand, elektrische schokken, enz.:
1. Verwijder geen schroeven, panelen of de behuizing.
2. Stel dit toestel niet bloot aan regen of vocht.

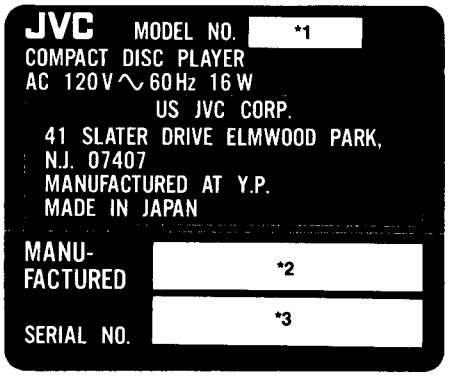
PRECAUCION

Para reducir riesgos de electrochoques, incendio, etc.:
1. No extraiga los tornillos, cubiertas o la caja.
2. No exponga este aparato a la lluvia o humedad.

IMPORTANT FOR LASER PRODUCTS

REPRODUCTION OF LABELS

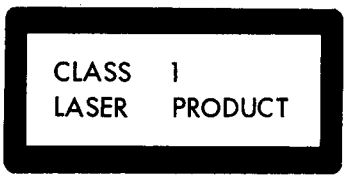
① IDENTIFICATION LABEL BY DHHS
(Only for the U.S.A.)



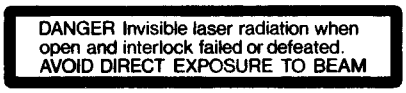
NOTE:
***1 Model Number**
***2 The date of manufacture**
***3 The serial number of production**

② CERTIFICATION LABEL BY DHHS
(Only for the U.S.A.)

③ CLASSIFICATION LABEL
(Only for Continental Europe, the U.K. and Australia)



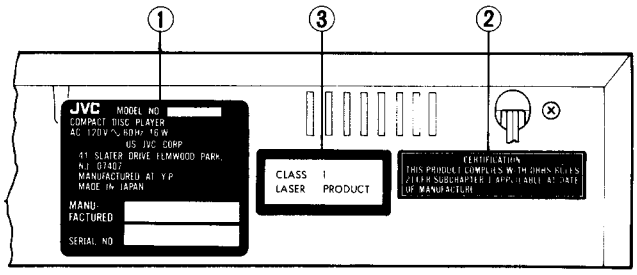
④ WARNING LABEL



ADVARSEL Usynlig laserstråling ved åbning,
når sikkerhedsafbrydere er ude af funktion.
Undgå udsættelse for stråling.

⑤ HAZARD SYMBOL LABEL
(Only for Continental Europe)

POSITION OF LABELS



(ON REAR ENCLOSURE)

④ WARNING LABEL and ⑤ HAZARD SYMBOL LABEL are placed inside the unit.
DO NOT OPEN THE COVER — THERE ARE NO SERVICEABLE PARTS INSIDE THE UNIT.

VARNING: Osynlig laserstrålning uppstår vid komponentens öppning när säkerhetsbrytaren är frånslagen.

ADVARSEL: Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

ADVARSEL: Usynlig laserstråling ved åpning når sikkerhetsbryteren er avslott. Unngå utsettelse for stråling.

VAROITUS: Suojakoteloa ei saa avata. Laite sisältää laserdiodin, joka lähettää (näkymätöntä) silmille vaarallista lasersäteilyä.

(See also next pages.)

IMPORTANT FOR LASER PRODUCTS

1. CLASS 1 LASER PRODUCT
2. **DANGER:** Invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to beam.
3. **CAUTION:** Do not open the top cover. There are no user serviceable parts inside the unit; leave all servicing to qualified service personnel.
4. **CAUTION:** The compact disc player uses invisible laser radiation and is equipped with safety switches which prevent emission of radiation when the drawer is open and the safety interlocks have failed or are defeated. It is dangerous to defeat the safety switches.
5. **CAUTION:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WICHTIGE HINWEISE FÜR LASER-PRODUKTE

1. LASER-PRODUKT DER KLASS 1
2. **GEFAHR:** Unsichtbare Laserstrahlung bei Öffnung und fehlerhafter oder beschädigter Sperre. Direkten Kontakt mit dem Strahl vermeiden!
3. **ACHTUNG:** Das Gehäuse nicht öffnen. Das Gerät enthält keinerlei Teile, die vom Benutzer gewartet werden können. Überlassen Sie Wartungsarbeiten bitte qualifizierten Kundendienst-Fachleuten.
4. **ACHTUNG:** Der Compact Disc Player arbeitet mit unsichtbaren Laserstrahlen und ist mit Sicherheitsschaltern ausgestattet, die die Aussendung von Strahlen verhindern, wenn der Halter ausgefahren ist und die Sicherheitssperren gestört oder beschädigt sind.
   Es ist gefährlich, die Sicherheitsschalter zu deaktivieren.
5. **ACHTUNG:** Falls Verwendung der Regler, Einstellungen oder Handhabung von den hierin gegebenen Anleitungen abweichen, kann es zu einer gefährlichen Strahlenfreisetzung kommen.

COMPU LINK
Control System

Fig. 1
Abb. 1
Afb. 1

COMPU LINK (remote) control system is a convenient system using SYNCHRO terminals on the rear panel. For further details, refer to page 9.

Das (Fern-) Bedienungssystem COMPU LINK ist durch Anschluß an die SYNCHRO-Anschlußbuchsen auf der Rückseite einfach zu verwenden, Einzelheiten dazu finden Sie auf Seite 9.

Thank you for purchasing this JVC product.
Before you begin operating this unit, please read the instructions carefully to be sure you get the best possible performance.
If you have any question, consult your JVC dealer.

Vielen Dank für den Kauf dieses JVC-Produkts.
Bitte lesen Sie diese Bedienungsanleitung sorgfältig, bevor Sie dieses Gerät in Betrieb nehmen, um die beste Leistung zu erhalten.
Falls Sie Fragen haben, wenden Sie sich bitte an Ihren JVC-Fachhändler.

PRECAUTION IN USE

- **Installation**
  - Select a place which is level, dry and **neither too cold nor too hot (between 5°C (41°F) and 35°C (95°F)). Do not place it especially on a heat generating object.**
  - Avoid a dusty place or a place subject to vibrations.
- **Power**
  - When unplugging from the wall outlet, always pull the plug, not the power cord.
- **Malfunctions, etc.**
  - Do not insert any metallic object inside the player.
- The discs to be played on this player are limited to those bearing the mark shown in Fig. 2.
- **Volume setting ...**
  As compact disc causes almost no noise, it is difficult to set the volume level by listening to noise as in the case of setting it for an ordinary analog turntable or a tape deck. If the volume level is raised too much because the beginning of the tune is quiet, the speakers may be damaged by a sudden increase of output.
- Placing something else other than a compact disc on the disc platter may cause the player to malfunction.
- If something goes wrong, turn the power off immediately. If the same phenomenon occurs when the power is turned on again, turn the power off and consult your JVC dealer.
- **Condensation ...**
  As the compact disc player uses optical parts, for example, a lens, etc., moving it from a cold to warm place or using it in a room subject to excessive humidity or in a room where the fire has just been lit may cause condensation on the optical parts. This phenomenon may prevent the light from being correctly transmitted, and may cause noise or malfunction.
  If dew condenses and the player does not function correctly, leave it for several hours with the power turned on.
  If the player does not function even after such a period, consult your dealer.

Notes:

- **When this unit is placed near a tuner or a receiver during an AM reception, noise may occur.**
- **If this happens, move this unit as far away from the tuner or the receiver as possible, or briefly turn the power of this unit off.**
- **While inserting the disc platter into this unit, if something gets stuck in between by mistake, follow the directions below.**
  1. **Remove the disc platter out by pressing the OPEN/CLOSE ⏏ button.**
  2. **Press the POWER button to turn off this unit.**
  3. **Insert the disc platter slowly into it.**
  4. **Turn the power back on by pressing the POWER button again.**

COMPACT disc DIGITAL AUDIO

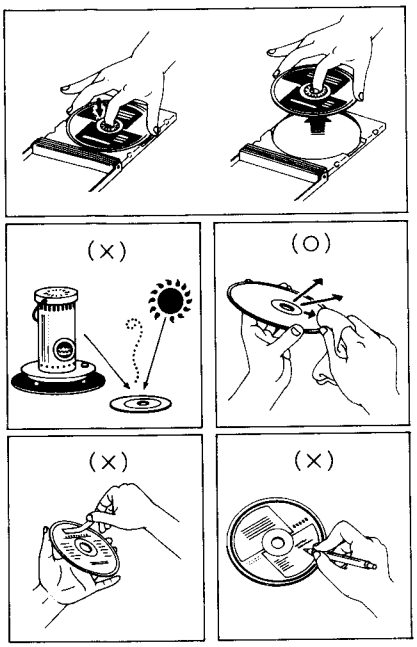
Fig. 2
Abb. 2
Afb. 2

VORSICHTSMASS-NAHMEN

- **Plazierung**
  - An einem ebenen, trockenen Ort mit **Temperaturen nicht unter +5°C und über +35°C aufstellen. Es niemals auf die Heizung aufstellen.**
  - Dieser Ort sollte auch staub- und vibrationsfrei sein.
- **Netzanschluß**
  - Das Netzkabel stets am Stecker, nicht am Kabel aus der Steckdose abziehen.
- **Betriebsstörungen etc.**
  - Keine metallischen Gegenstände in den Player einführen.
- Alle auf diesem Player spielbaren Kompaktplatten müssen die in Abb. 2 dargestellte Markierung aufweisen.
- **Lautstärkeeinstellung ...**
  Da Compact-Discs im Vergleich zu analogen Plattenspielern und Bandgeräten äußerst geräuscharm laufen, ist es schwierig, den Lautstärkepegel vor Beginn eines Titels einzustellen. Wird der Verstärker-Lautstärkepegel zu hoch eingestellt, können die Lautsprecher durch einen plötzlichen lauten Klangeinsatz beschädigt werden.
- Außer Compact-Discs nichts im Disc-Halter plazieren, um Störungen zu vermeiden.
- Bei jeder Betriebsstörung den Player sofort abschalten. Erscheint die gleiche Störung bei Wiedereinschalten des Geräts, wieder abschalten und einen JVC-Händler zu Rate ziehen.
- **Kondensation ...**
  Da der Player optische Teile entält (Linse etc.), kann es u.a. an diesen optischen Teilen zu Kondensation kommen, wenn das Gerät von einem kalten an einen wärmeren Ort geschafft wurde, oder der Aufstellungsort schnell aufgeheizt wird, bzw. dieser sehr hohe Luftfeuchtigkeit aufweist. Die Kondensation kann somit die korrekte Lichtübertragung verhindern, wodurch Störgeräusche bzw. Betriebsstörungen hervorgerufen werden können. Im Falle einer durch Kondensation hervorgerufenen Störung den Player eingeschaltet für einige Stunden trocknen lassen.
  Sind nach einem angemeßenem Zeitraum immer noch störungen konstatierbar, einen JVC-Händler zu Rate ziehen.

Hinweise:

- **When diese Einheit neben ein Tuner oder ein Empfangsgerät steht während ein AM-Empfang, kann es Störgeräuch entstehen.**
- **Im diese Fall, die Einheit so weit wie moglich von der Tuner oder Empfangsgerät entfernen, oder die Einheit fur eine Augenblick abschalten.**
- **Indem, beim Einladen des Disk-Halters bei Zufall, etwas zwischen Halter und Player stecken bleibt, die hinuntere Unterrichtungen nachfolgen.**
  1. **Die OPEN/CLOSE ⏏ Taste betätigen, um den Disk-Halter auszufahren.**
  2. **Die POWER -Taste betätigen um die Einheit abzuschalten**
  3. **Langsam der Disk-Halter wieder einbringen.**
  4. **Die POWER -Taste betätigen um die Einheit wieder einzuschalten.**



HOW TO HANDLE A COMPACT DISC

Since compact discs are plastic, they are easily damaged; if they get dirty, dusty, damaged or warped, the signal will not be picked up correctly, and such discs may cause the player to malfunction. When using a compact disc, take care of the following points.

- Do not touch the surface to be played (reflective silver i.e. the side without the label) when playing or handling the discs.
- **Storage**
  Make sure to keep discs in their cases.
  If discs are piled on top of one another without cases, they may be damaged. Do not put discs in a place exposed to direct sunlight or in a place with high temperature and humidity.
  Especially, avoid leaving discs in your car.
- **Maintenance of discs**
  When fingerprints and dirt adhere to a disc, wipe off with a soft and dry cloth.
  If it is difficult to clean, wipe off with a cloth moistened with water.
- Do not use analog record cleaners, benzine, alcohol or antistatic agent.
- Do not damage the label side or stick paper or adhesive tape to it.

BEHANDLUNG EINER COMPACT-DISC

Da Compact-Discs aus Kunststoff hergestellt sind, können sie leicht beschädigt werden. Bei Beschädigung, Verschmutzung, Staubablagerung oder Deformation kann das Signal nicht korrekt abgelesen werden, wodurch möglicherweise Betriebsstörungen des Players hervorgerufen werden.
Bei Benutzung einer Compact-Disc auf folgende Punkte achten.

- Die Abspielfäche (die silbrig reflektierende bzw. unbedruckte Seite) nicht berühren.
- **Lagerung**
  Eine Compact-Disc stets in der mitgelieferten Schutzhülle aufbewahren.
  Werden Compact-Discs ohne Schutzhülle aufeinander gelagert, können sie beschädigt werden. Compact-Discs niemals direktem Sonnenlicht oder hohen Temperaturen bzw. Feuchtigkeit aussetzen. Compact-Discs nicht im Auto liegen lassen.
- **Pfege von Compact-Discs**
  Sind Fingerabdrücke bzw. Schmutz erkennbar, diese mit einem weichen und trockenen Tuch abwischen.
  Wenn notwendig, ein mit Wasser angefeuchtetes Tuch verwenden.
- Keinerlei Schallplattenreinigungsmittel, Benzin, Alkohol oder antimagnetische Reiniger verwenden.
- Die Etiquette-Seite nicht beschädigen oder bekleben.

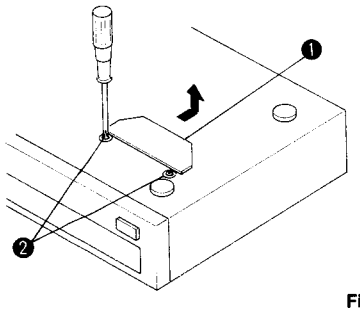


Fig. 3
Abb. 3
Afb. 3

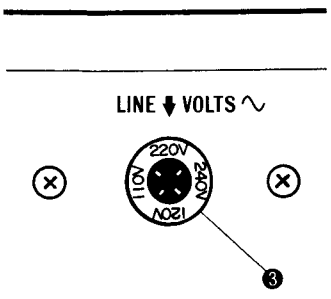


Fig. 4
Abb. 4
Afb. 4

BEFORE USE

Do not insert power plug to the receptacle until completion of all the preparations.

1. Remove a holder ❶ and two screws ❷ for transportation. (Fig. 3)

Note:
- **Be sure to keep the holder and screws.**
- **Be sure to prepare for shipment according to the procedures opposite to the above.**

2. Set the voltage selector ❸ to your local line voltage. (Fig. 4)
   When this equipmemt is used in an area where the supply voltage is different from the preset voltage, reset the voltage selector to the correct position.
   (Not provided on units for U.S.A., Canada, Australia, U.K. and Continental Europe.)

VOR INGEBRAUCH-NAHME

Das Netzkabel erst an die Wandsteckdose anschließen, wenn alle Vorbereitungen durchgeführt wurden.

1. Halterung ❶ und die zwei Schrauben ❷ für Transportsicherung entfernen. (Abb. 3)

Hinweis:
- **Halterung und Schrauben unbedingt aufbewahren.**
- **Für eventuellen späteren Transport, die oben beschriebenen Maßnahmen in sinngemaß umgekehrter Reihenfolge durchführen.**

2. Schalten Sie den Spannungswähler ❸ auf Ihre örtliche Netzspannung. (Abb. 4)
   Wenn die vorengestellte Netzspannung an diesem Gerät nicht mit der tastächlich vorhandenen übereinstimmt, den Spannungswähler auf den erforderlichen Wert einstellen.
   (Nicht vorgesehen an den Geräten, die für die USA, Kanada, Australien, Größbritannien und Kontinental-Europa bestimmt sind)

CONNECTION DIAGRAM
ANSCHLUSSDIAGRAMM
SCHEMA DE RACCORDEMENTS
AANSLUITINGSSCHEMA
DIAGRAMA DE CONEXIONES

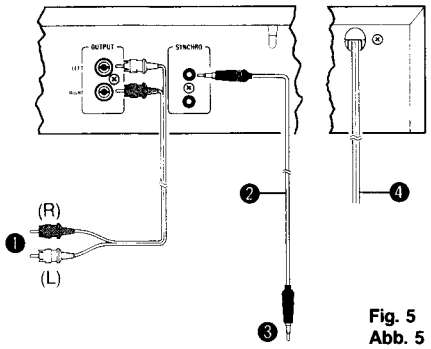


Fig. 5
Abb. 5
Afb. 5

❶ To the input terminal (CD, AUX or TAPE PLAY) of an amplifier.
Zum Eingangsanschluß (CD, AUX, oder TAPE PLAY) das Verstärkers.
Vers la borne d'entrée (CD, AUX ou TAPE PLAY) d'un amplificateur.
Naar ingangaansluiting (CD, AUX, of TAPE PLAY) van een versterker.
Hacia el terminal de entrada (CD, AUX o TAPE PLAY) de un amplificador.

❷ Provided remote cable
Mitgeliefertes Fernbedienkabel
Câble de télècommande fourni
Bijgeleverde afstandsbedieningskabel
Cable de control remote suministrado

❸ To the "SYNCHRO" terminal of an amplifier or a cassette deck.
Zum "SYNCHRO" Anschluß eines verstärkers oder eines Cassettendecks.
Hacia el terminal "SYNCHRO" de un amplificador o magnetófono.

❹ To the wall outlet.
Zur Netzsteckdose.
Vers une prise secteur.
Naar stopkontakt.
Hacia el tomacorriente.

■ Connecting to an amplifier

Notes:
- **When connecting any component, set the POWER button to off.**
- **Connect the plugs firmly after confirming the L (Left) and R (Right).**

Connect the OUTPUT terminals of the player to the input terminals (CD, AUX or TAPE PLAY) of the amplifier with the provided signal cords as shown in Fig. 5.
(Do not connect to the PHONO terminals of the amplifier.)

■ Connecting to a cassette deck etc.

Connect the SYNCHRO terminals of this unit to the SYNCHRO terminals of an amplifier, cassette deck, etc. to generate COMPU LINK Control System. Concerning compatible amplifiers or cassette decks, consult your dealer.

■ COMPU LINK CONTROL SYSTEM

This is a convenient system which has been originated and developed by JVC. The following are the brief explanations of its major performances:

Automatic Source Selection
When the provided remote cables are used for connecting this unit to other components which have SYNCHRO terminals, the switch-over of all system components is possible with simple one-touch of the source selector button of JVC's amplifier or receiver. By doing this, the corresponding component will start playing automatically. The source select button of the remote control unit or the activation button of the desired component can be also used for this purpose.
When the components have been switched over, the previous component will stop playing within five seconds.

Synchronized Recording
Synchronized recording refers to the process in which the cassette deck starts recording in synchronism with the CD player. Perform the synchronized recording as follows.
1. Set the cassette deck to the REC/PAUSE mode in accordance with the procedures in the instruction manual.
2. If you want the programmed recording, program the desired tunes in any order you wish to hear.
3. Press the PLAY/PAUSE button of the CD player. By so doing, the cassette deck is placed in the record mode and synchronized with the CD player for recording. Synchronized recording thus can be made possible.

■ Anschluß an einen Verstärker

Hinweise:
- **Bei Anschlüssen aller Art die Netzspannung ausschalten.**
- **Die Stecker auf richtigen (Links/Rechts) Anschluß und sicheren Sitz überprüfen.**

Die OUTPUT- Buchsen des Players über die mitgelieferten Kabel mit den Eingangsbuchsen des Verstärkers (CD, AUX oder TAPE PLAY) verbinden, wie in Abb. 5 gezeigt.
(Nicht an den PHONO-Buchsen des Verstärkers anbringen!)

■ Anschluß an ein Cassettendeck u.s.w.

Die SYNCHRO-Buchsen dieses Geräts an die SYNCHRO-Buchsen eines Verstärkers, Kassettendecks o.a. anschließen, um das COMPU LINK Bedienungssystem zu aktivieren. Ihr Audio-Händler kann Ihnen die zusammenpassenden Geräte vorstellen.

■ COMPU LINK BEDIENUNGSSYSTEM

Dieses bedienungsfreundliche System ist bei JVC erfunden und entwickelt worden. Es folgen kurze Erläuterungen seiner Eigenschaften:

Automatische Quellenwahl
Wenn die mitgelieferten Verbindungskabel zum Anschluß dieses Geräts an andereKomponenten verwendet werden, die mit SYNCHRO-Anschlußbuchsen ausgestattet sind, dann lassen sich sämtliche Bauteile mit einem einzigen Druck auf die Quellenwahltaste des JVC-verstärkers oder -Receivers umschalten. Das entsprechende Gerät beginnt dann automatisch zu spielen. Die Quellenwahltaste der Fernbedienung oder die Auslösetaste der gewünschten Komponente kann ebenso dazu verwendet werden. Wenn die Komponenten umgeschaltet sind, wird der Wiedergabebetrieb ds vorigen Bauteils innerhalb fünf Sekunden abgebrochen.

Synchronisierte Aufnahme
Synchronisierte Aufnahme ist ein Vorgang, wo das Cassettendeck seinen Aufnahmebetrieb gleichzeitig zum CD-Player aufnimmt. Snychronaufnahmen wie folgend durchführen.

1. Das Cassettendeck gemäß den Anweisungen der Bedienungsanleitung auf Betrieb REC/PAUSE stellen.
2. Für vorprogrammierte Aufnahmen die aufzunehmenden Stücke in der gewünschten Reihenfolge einprogrammieren.
3. Die PLAY/PAUSE-Taste des CD-Players drücken. Das Cassettendeck wird dadurch auf Aufnahmebetrieb geschaltet und für synchrone Aufnahmen vom CD-Player bereitgestellt.

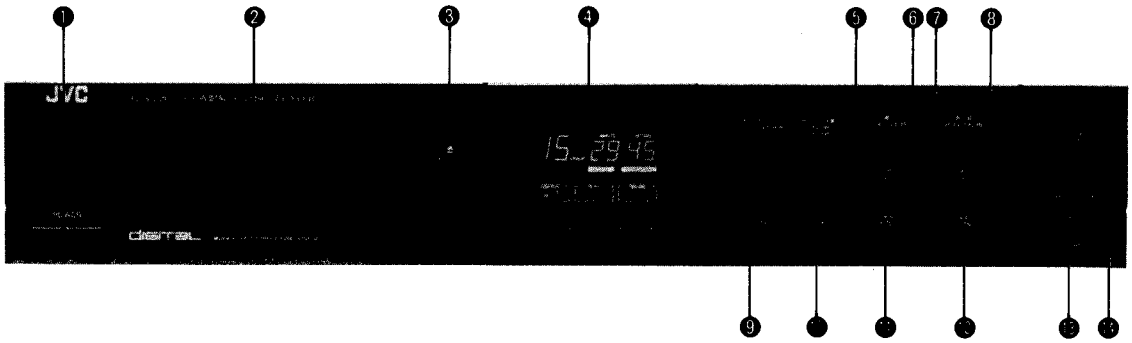
Notes:

- Synchronized recording stops automatically when the CD player stops playing.
- To cancel synchronized recording, press the STOP button of the CD player or cassette deck.
- Press the REC and PLAY buttons of the cassette deck when starting in the middle of play.
- During synchronized recording, the operation of the PLAY/PAUSE button is interlocked with the cassette deck.
- When the REC/PAUSE mode is set by pressing PAUSE button after pressing the REC and PLAY buttons simultaneously, synchronized recording is not possible. For details, refer to the instruction manual of the cassette deck.
- Abnormal operation will result if the power supply of the component(s) is interrupted midway. If this happens, press the activation button again to restart.
- Ensure that the SYNCHRO terminals of individual components are connected with the provided remote cables. Also be sure to read the instruction manual for each component very carefully.
- The source is locked to the CD position during synchronized recording to avoid accidental stops or switch-over to another component. To switch over the components, cancel synchronized recording first.

Hinweise:

- Die Synchronaufnahme wird automatisch abgebrochen, wenn sich der CD-Player abschaltet.
- Zum Ausschalten einer Synchronaufnahme die STOP-Taste am CD-Player oder Cassettendeck drücken.
- Für Aufnahmen, die in der Plattenmitte beginnen sollen, sind die Tasten REC und PLAY am Cassettendeck zu betätigen.
- Während Synchronaufnahmen ist die Funktion der Taste PLAY/Pause mit dem Cassettendeck zusammengeschaltet.
- Wenn man nach gleichzeitigem Betätigen der Tasten REC und PLAY auf Betrieb REC/PAUSE schaltet, indem man die PAUSE-Taste drückt, dann ist keine synchrone Aufnahme möglich. Einzelheiten dazu entnehmen Sie bitte der Bedienungsanleitung des Cassettendecks.
- Es kommt zu Betriebsstörungen, wenn die Stromversorgung eine soder mehrerer Anlagenteile unterbrochen wird. In solch einem Fall ist zum Neustart die Auslösetaste zu drücken.
- Versichern Sie sich, daß die SYNCHRO-Buchsen einzelner Anlagenteile mit den vorgesehenen Verbindungskabeln versehen sind. Ebenfalls nicht versäumen, die Bedienungsanleitungen der einzelnen Geräte sorgfältig durchzulesen.
- Die Aufnahmequelle ist während der Synchronaufnahme auf die CD-Position festgeschaltet, um ungewolltes Unterbrechen oder Umschalten auf eine andere Anlagenkomponente zu verhindern. Vor dem Umschalten auf ein anderes Gerät ist die Synchronaufnahme daher zuerst abzuschalten.

DESCRIPTION AND FUNCTIONS
BESCHREIBUNG UND FUNKTIONEN



❶ **POWER**
Press to switch on the POWER, and the display lights. Press again to switch off the POWER, and the display goes off.

❷ **Disc platter**
Load the disc to be played.
While the disc platter is moving, do not turn the power off or push the disc platter by hands, etc.

❸ **OPEN/CLOSE (▲)**
Press to move the disc platter in and out. Press once and the disc platter will move out; now load a disc and press again to move the platter back in. The disc is now ready to be played.
If it is pressed during play, play is interrupted, the program is erased from memory and the disc platter comes out.

❹ **Display**
This shows various program data including playing time, tune number, etc. For more details, see "DISPLAY" on page 23.

❺ **STOP (■)/CLEAR**
Press this button once to stop playing and twice to erase the programmed tunes.

❻ **SKIP (⏮) (backward)**
Press once during play to return the sensor to the start of the current tune. Press twice to return the sensor to the start of the previous tune. Each time it is pressed, the sensor moves backward by one tune. Keep pressing this button to return to the beginning of the previous tune.

❼ **SKIP (⏭) (forward)**
Press once during play to move the sensor to the start of the next tune. Each time it is pressed, the sensor moves forward by one tune. Keep pressing this button to proceed to the beginning of the next tune.

❶ **Netzspannung (POWER)**
Zum Einschalten der Stromversorgung (POWER) betätigen; die Anzeigelampe leuchtet auf. Zum Ausschalten des Netzstroms die Taste noch einmal betätigen; die Anzeigelampe erlischt.

❷ **Disc-Halter**
Die für Abspielbetrieb vorgesehene Disc laden.
Wenn der Disc-Halter bewegt wird, die Spannungsversorgung nicht ausschalten, den Disc-Halter nicht per Hand bewegen etc.

❸ **Öffnen/Schließen-Taste (OPEN/CLOSE ▲).**
Zum Ein- und Ausfahren des Disc-Halters drücken. Einmal drücken, so daß der Disc-Halter ausgefahren wird. Eine Disc laden, und nochmals drücken, so daß der Disc-Halter wieder eingefahren wird. Die Disc ist nun abspielbereit.
Wird diese Taste während der Wiedergabe gedrückt, wird letztere abgebrochen, das Programm aus dem Speicher gelöscht und der Disc-Halter ausgefahren.

❹ **Display**
Das Display informiert über verschiedene Programmierdaten, inkl. Wiedergabezeit, Titelnummer etc.. Weitere Angaben im Abschnitt "ANZEIGEN" auf Seite 23.

❺ **STOP (■)/CLEAR-Taste**
Taste einmal drücken, um die Wiedergabe abzubrechen, bzw. zweimal, um die vorprogrammierten Titel zu löschen.

❻ **Sprungtaste (SKIP ⏮) (rückwärts)**
Während der Wiedergabe wird der Abnehmer durch einmaliges Betätigen dieser Taste zum Anfang des jeweils eingestellten Titels gesetzt. Bei zweimaliger Betätigung wird der Abnehmer zum Anfang des jeweils vorherigen Titels gesetzt. Wenn diese Taste innerhalb einer Sekunde betätigt wird, wird der Abnehmer um je einen Titel zurückgesetzt. Diese Taste betätigen um zurück zu gehen zum Anfang des vorherigen Titels.

❼ **Sprungtaste (SKIP ⏭) (vorwärts)**
Während der Wiedergabe wird der Abnehmer durch einmaliges Betätigen dieser Taste jeweils zum Anfang des folgenden Titels gesetzt. Jedes Betätigen der Taste setzt den Abnehmer um einen Titel weiter. Diese Taste betätigen um weiter zu gehen zum Anfang vom nächste Titel.

❽ **PLAY (►)/PAUSE (II)**
Press this button to start play from the first tune or the programmed play after the loading of a disc is finished. Press this button again to suspend play temporarily; the PAUSE indicator lights. To restart playing, press this button again.

❾ **PROGRAM**
Press this button to program tunes.
The PROGRAM indicator lights when programming or playing back programmed tunes.

❿ **REPEAT**
Press for repeat play of all the tunes on a disc or the programmed tunes. Then the REPEAT indicator lights.
To release the repeat mode, press again and the indicator goes off.

⓫ **SEARCH (◄◄) (backward)**
Press to search for the required tune by moving the sensor back.

⓬ **SEARCH (►►) (forward)**
Press to search for the required tune by moving the sensor forward; sound can be heard at reduced volume level while search is taking place in the play mode.

⓭ **PHONES**
Connect head-phone plug.

⓮ **PHONES LEVEL**
Adjust the headphones volume level with this knob.

❽ **Wiedergabe/Pause-Taste (PLAY ► /PAUSE II)**
Diese Taste betätigen, um die Wiedergabe vom ersten Titel an oder die programmierte Wiedergabe zu starten, nachdem. der Ladevorgang beendet is. Bei nochmaligem Betätigen dieser Taste wird die Wiedergabe zeitweilig unterbrochen; das PAUSE Zeichen leuchtet. Zur Fortsetzung der Wiedergabe diese Taste nochmals betätigen.

❾ **Programmtaste (PROGRAM)**
Diese Taste betätigen, um Titel zu programmieren.
Bei Programmierung oder Wiedergabe programmierter Titel leuchtet die PROGRAM Anzeige.

❿ **Wiederholungstaste (REPEAT)**
Diese Taste betätigen, um alle oder programmierte Titel zu widerholen. Die REPEAT Anzeige leuchtet.
Zur Abschaltung der Wiederholfunktion die Taste nochmals betätigen; die Anzeige erlischt.

⓫ **Suchtaste (SEARCH ◄◄) (rückwärts)**
Diese Taste betätigen, um den Abnehmer für Suchlauf bis zu einem gewünschten Titel in Rückwärtsrichtung bewegen.

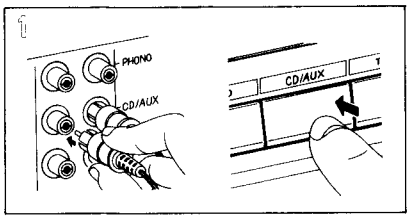
⓬ **Suchtaste (SEARCH ►►) (vorwärts)**
Diese Taste betätigen, um den Abnehmer für Suchlauf in Vorwärtsrichung zu bewegen. Bei Durchführung des Suchlaufs während der Wiedergabe bleibt der Ton bei reduzierter Lautstärke eingeschaltet.

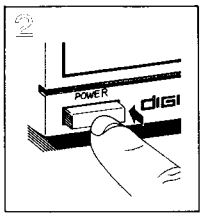
⓭ **Kopfhörer (PHONES)**
Zum Anschluß des Kopfhörerkabels.

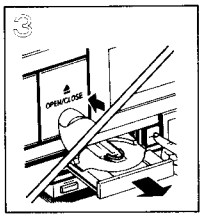
⓮ **Kopfhörer-Lautstärke (PHONES LEVEL)**
Mit diesem Knopf stellt man den Lautstärkepegel für die Kopfhörer ein.

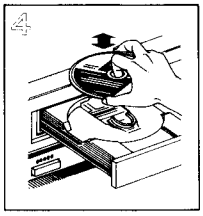
HOW TO OPERATE

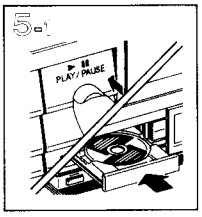
BEDIENUNG

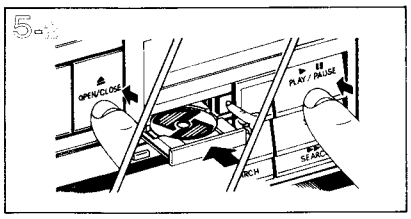


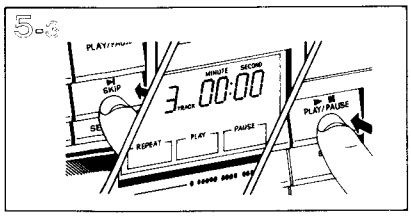


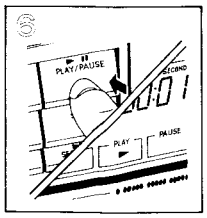


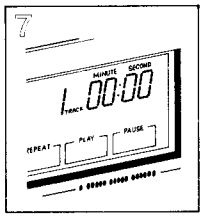












Normal play

1. Set the source selector of your amplifier to correspond to the terminals to which the player is connected (CD or TAPE PLAY).
2. Press the [POWER] button.
3. Press the [OPEN/CLOSE ▲] button to move out the platter.
4. Load a disc with its label up.
   Make sure the disc fits correctly on the platter.

5-1. Press the [PLAY ▶/PAUSE ❚❚] button. The platter moves into the player automatically and play starts from the first tune. Or,

5-2. Press the [OPEN/CLOSE ▲] button to display the contents of the disc for about 3 seconds. After this, press the [PLAY ▶/PAUSE ❚❚] button.

5-3. Press the [SKIP ▶|] button until the required track number is displayed, then press the [PLAY ▶/PAUSE ❚❚] button to start playback.

6. During play, the track number and the elapsed time of the selection being played are shown in the display window.
7. When play is finished, the laser pickup moves back to the first tune, and play automatically stops with the operation held on standby.

Note:

- **While the disc platter is moving, do not turn the power off or push the disc platter by hands, etc.**

Normale Wiedergabe

1. Den Signalewahlschalter des Verstärkers entsprechend dem für den Player gewählten Anschluß einstellen (CD, AUX oder TAPE PLAY).
2. Druk op de netschakelaar [POWER].
3. Die [OPEN/CLOSE ▲]-Taste betätigen, um den Disc- Halter auszufahren.
4. Eine Compact-Disc mit nach oben zeigendem Etiquette einlegen.
   Auf korrekten Sitz der Compact-Disc achten.

5-1. Die [PLAY ▶/PAUSE ❚❚]-Taste betätigen. Der Disc-Halter wird eingefahren, und die Wiedergabe startet vom ersten Titel an. Oder.

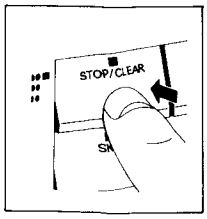
5-2. Die [OPEN/CLOSE ▲]-Taste betätigen, so daß der Disc-Inhalt für ca. 3 Sekunden angezeigt wird. Hierauf die [PLAY ▶/PAUSE ❚❚]-Taste betätigen.

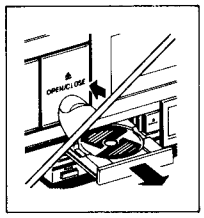
5-3. Die [SKIP ▶|] -Taste betätigen, bis die gewünschte Titelnummer im Display erscheint. Zum Wiedergabestart dann die [PLAY ▶/PAUSE ❚❚] -Taste betätigen.

6. Während der Wiedergabe werden Nummer und verstrichene Zeitspanne des laufenden Titels im Anzeigefenster angegeben.
7. Nach Ende der Wiedergabe kehrt der Laser-Tonabnehmer selbsttätig zum ersten Titel-zurück, und die Wiedergabe wird abgebrochen, wobei das Gerät in Betriebsbereitschaft bleibt.

Hinweis:

- **Solange sich der Disc-Halter bewegt, die Spannungsversorgung nicht abschalten, den Disc-Halter nicht von Hand bewegen etc.**



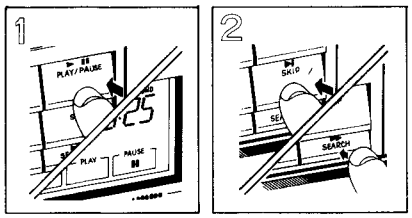


To stop play

- Press the [STOP ■/CLEAR] button; play stops and the player enters the standby mode. (The condition when a disc has been loaded and its contents have been read.)
- To remove the disc, press the [OPEN/CLOSE ▲] button. After removal of the disc, press the [OPEN/CLOSE ▲] button again to retract the disc platter.

Beenden der Wiedergabe

- Die [STOP ■/CLEAR] -Taste betätigen; die Wiedergage wird beendet, und der Player wird auf Betriebsbereitschaft geschaltet (Der gleiche Status wie nach Einlegen und Wieder gabebereitshaft einer Disc und Ablesen des Disc-Inhalts.)
- Zum Entnehmen der Disc die [OPEN/CLOSE ▲] -Taste betätigen. Nach Entnehmen der Disc nochmals die [OPEN/CLOSE ▲] -Taste betätigen,um den Disc-Halter wieder einzufahren.



To stop play temporarily

1. Press the PLAY ▶ /PAUSE ❚❚ button. The PAUSE indicator lights then play stops with the pickup in the same position.
2. The SKIP ⏮ , SKIP ⏭ buttons and the manual search operation can be performed in the pause mode.

- To use the manual search function, press the SEARCH ◀◀ , SEARCH ▶▶ buttons and scan to the desired positon while watching the time display. When the required time is displayed, press the PLAY ▶ /PAUSE ❚❚ button.

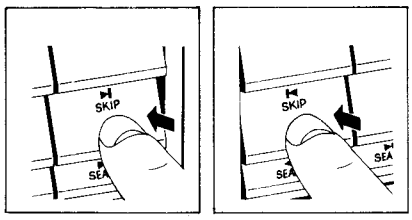
3. To restart play, press the PLAY ▶ /PAUSE ❚❚ button. The PAUSE indicator will go out.

Unterbrechung der Wiedergabe

1. Die PLAY ▶ /PAUSE ❚❚ -Taste betätigen. das PAUSE Zeichen leuchtet; die Wieder gabe stoppt und der Tonabnehmer bleibt in dieser Position.
2. Bei Pause-Betriebsart können die SKIP ⏮ , SKIP ⏭ -Taste betätigt und der manuelle Suchlauf durchgeführt werden.

- Bei manuellem Suchlauf die SEARCH ◀◀ , SEARCH ▶▶ -Tasten drücken, und den Suchaluf zuf gewünschten Position unter Beobachtung der Zeitanzeige durchführen. Bei Erreichen der gewünschten Zeitposition, die PLAY ▶ /PAUSE ❚❚ -Taste drücken.

3. Zur Fortsetzung der Wiedergabe,die PLAY ▶/PAUSE ❚❚ -Taste drücken, worauf das PAUSE Zeichen erlischt.

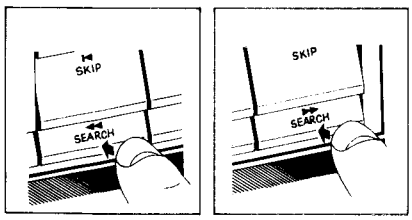


To scan to another tune during play

- Press the SKIP ⏭ button to start play from the start of the next tune. Press the SKIP ⏮ button once to restart play from the start of the current tune. To sart play from the previous tune, **press the SKIP ⏮ button twice.**
- Since each time the SKIP ⏮ , SKIP ⏭ buttons are pressed, the sensor moves forward or backward in steps of one tune, press them the required number of times. In addition, keep pressing these buttons to return/proceed to the requested tune.

Titelsuche während der Wiedergabe

- Die SKIP ⏭ -Taste betätigen, um die Wiedergabe vom jeweils folgenden Titel an zu starten. Die SKIP ⏮ -Taste betätigen, um die Wiedergabe vom jeweils wiedergegebenen Titel erneut zu starten. Um die Wierdergabe vom Beginn des jeweils vorherigen Titels zu starten, **die SKIP ⏮ -Taste zweimal betätigen.**
- Mit jeder Betätigung der SKIP ⏮ , SKIP ⏭ -Tasten wird der Abnehmer in Ein-Titel Schritten in Vorwärts- oder Rückwärtsrichtung bewegt, die Taste wie erforderlich betätigen. Außerdem, diese Tasten betätigen un zurück- oder weiter zu gehen bis zum gewunschten Titel.

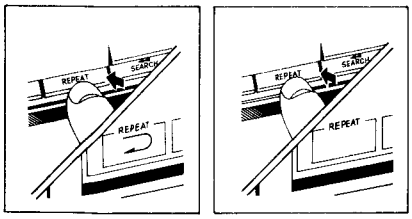


Manual search

- When either of the SEARCH ◀◀ , SEARCH ▶▶ buttons are pressed during play, the sensor moves and you can hear speeded up sound at reduced volume.
- When SEARCH ◀◀ , SEARCH ▶▶ buttons are used in the pause mode, operate these buttons while watching the time display as there is no sound.

Manueller Suchlauf

- Wird eine der SEARCH ◀◀ , SEARCH ▶▶ Tasten während der Wiedergabe gedrücket, wird der Abnehmer bewegt, wobei die beschleunigte Tonwiedergabe bei reduzierter Lautststärke erfolgt.
- Werden die SEARCH ◀◀ , SEARCH ▶▶ Tasten bei Pausebetrieb betätigt, die Zeitanzeige beachten, da in diesem Fall keine Tonwiedergabe erfolgt.

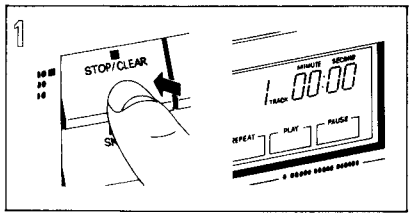


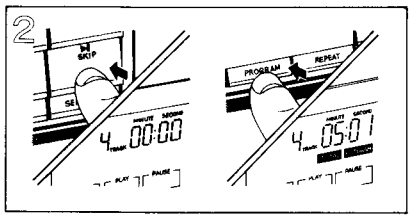
Repeat play

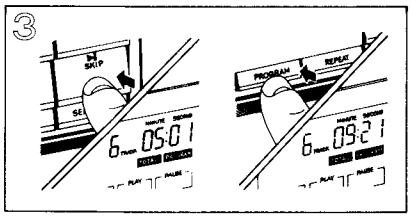
1. Press the REPEAT button to repeat the whole disc or the programmed tunes in the programmed order; the REPEAT indicator lights.
2. To release the repeat function, press the REPEAT button again.

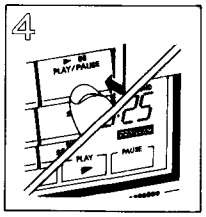
Wiedergabe-Wiederholung

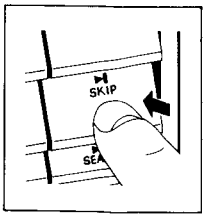
1. Zur Wiederholung der gesamten Disc oder der programmierten Titel in vorbestimmter Reihenfolge die REPEAT -Taste betätigen; die REPEAT Anzeige leuchtet.
2. Zur Abschaltung der Wiederholfunktion die REPEAT -Taste erneut betätigen.

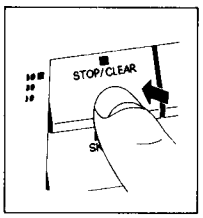












Programmed play

e.g.: the 4th tune is played first, then the 6th tune.

1. Press the [STOP ■ /CLEAR] button to set the player to the standby mode.
2. Press the [SKIP ▶|] button to show 4 as a track number then press the [PROGRAM] button. When the 4th tune has been programmed, the play time of the 4th tune is displayed.
3. Press the [SKIP ▶|] button to show 6 as a track number then press the [PROGRAM] button. When the 6 th tune has been programmed, the total play time of the 4nd and 6th tunes is displayed.
4. Press the [PLAY ▶ /PAUSE ❚❚] button.
5. Then, play starts and proceeds in order of the programmed tunes — the 4th tune first and the 6th tune next.

Notes:

- **A maximum of 15 programs can be selected from 99 tunes.**
- **When the total playing time of the programmed tunes exceeds 99 minutes 59 seconds, it is not displayed and only center bars are shown in the display.**
- **When the tune number to be programmed exceeds the 16th, the subsequent playing time indication shows only center bars.**
- **Since the total playing time of tunes programmed is displayed, it is convenient when recording tapes.**
- **During programmed play or in the pause mode, pressing the [SKIP ▶|] button skips to the next tune in the programmed order.**
- **To stop temporarily during programmed play, press the [PLAY ▶ /PAUSE ❚❚] button; press this button again to restart.**
- **When the programmed play is performed, the tune number programmed first and the total playing time of programmed tunes are displayed.**

To check or correct the programmed tunes

- **Checking the contents of the program**

  Each time the [SKIP ▶|] button is pressed in the pause mode or after starting play, the tune numbers of the programmed tunes are displayed in turn.

- **Correcting a program**

1. To erase all the programmed musics, press the [STOP ■ /CLEAR] button to enter the disc to the stand-by state, and then press the [STOP ■ /CLEAR] button again.
2. To correct the contents of the program, erase the program in the same manner as in 1, and then restart programming from the beginning.

Programmierte Wiedergabe

Beispiel: Zuerst Wiedergabe des 4. Titels, dann des 6. Titels.

1. Die [STOP ■ /CLEAR] -Taste betätigen, um den player auf Betriebsbereitschaft zu stellen.
2. Die [SKIP ▶|] -Taste betätigen, so daß Titelnummer 4 angezeigt wird, dann die [PROGRAM] -Taste betätigen. Nach Programmierung des 4. Titels wird dessen Spielzeit angezeigt.
3. Die [SKIP ▶|] -Taste betätigen, so daß Titelnummer 6 angezeigt wird, dann die [PROGRAM] -Taste betätigen. Nach Programmierung des 6. Titels wird die Gesamtspielzeit von 6. und 4. Titel angezeigt.
4. Die [PLAY ▶ /PAUSE ❚❚] -Taste betätigen.
5. Die Wiedergabe beginnt dann in der vorprogrammierten Reihenfolge - der 4. Titel also zuerst und danach der 6. Titel.

Hinweise:

- **Aus 99 Titeln können maximal 15 Programme gewählt werden.**
- **Überschreitet die Gesamtspielzeit der programmierten Titel 99 Minuten, 59 Sekunden, erfolgt keine Zeitanzeige, sondern es erscheinen Mittelstreifen im Display.**
- **Uberschreitet die Zahl der zu programmierenden Titel den 16. Titel, erscheinen anstelle der Spielzeitangabe Mittelstreifen.**
- **Die Anzeige der Gesamtspielzeit ist bei Bandaufnahmen sehr hilfreich.**
- **Wird die [SKIP ▶|] -Taste bei programmierter Wiedergabe oder in der Pausefunktion betätigt, erfolgt die Wiedergabe-Fortsetzung beim nächsten, programmierten Titel.**
- **Soll die programmierte Wiedergabe unterbrochen werden, die [PLAY ▶ /PAUSE ❚❚] -Taste betätigen; zum erneuten Start diese Taste nochmals betätigen.**
- **Bei programmierter Wiedergabe ersheint die erste programmierte Titelnummer und die Gasamtspielzeit aller programmierter Titel im Display.**

Überprüfung und Korrektur der Programmierung

- **Überprüfung des Programminhalts**

  Bei Pausebetrieb oder nach Wiedergabestart bewirkt jedes Betätigen der [SKIP ▶|] -Taste die Anzeige der programmierten Titel im Display.

- **Programmkorrektur**

1. Um alle programmierten Musikstellen zu löschen, die [STOP ■ /CLEAR] -Taste zu nächst einmal drücken, um den Compact Disc-Player in Bereitschaftsbetrieb zu setzen und anschließend die [STOP ■ /CLEAR] Taste noch einmal drücken.
2. Zur Korrektur von Programminhalten, das Programm zunächst wie in Abschnitt 1 löschen und die gewünschten Stellen neu programmieren.

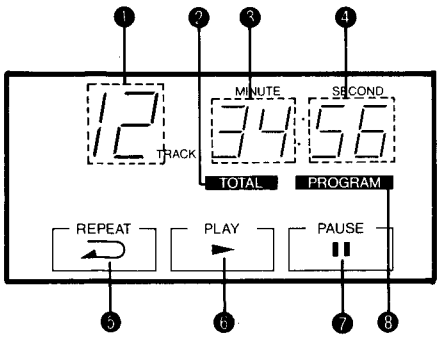


Fig. 7
Abb. 7
Afb. 7

DISPLAY

1. The total number of tunes is displayed for about 3 seconds when a disc has been loaded and set for play. The track number of the current tune is displayed while a disc is being played.
2. TOTAL lights when a disc has been loaded or during programming.
3. The elapsed playing time appears in minutes.
4. The elapsed playing time appears in seconds.
5. This mark lights when the REPEAT button is pressed.
6. This mark lights during play.
7. This mark lights in the pause mode.
8. This mark lights during programming.

DISPLAY

1. Nach Laden und Wiedergabeeinstellung einer Kompaktplatte wird die Anzahl der gesamten Titel 3 Sekunden lang im Anzeigefenster angegeben. Die Nummer des gegenwärtigen Titels wird während der Wiedergabe angezeigt.
2. Die Anzeige TOTAL leuchtet auf, wenn eine Kompaktplatte geladen wurde, oder aber während des Programmierens.
3. Die verstrichene Spielzeit wird in Minuten angegeben.
4. Die verstrichene Spielzeit wird in Sekunden angegeben.
5. Dieses Symbol leuchtet bei Betätigen der REPEAT-Taste auf.
6. Dieses Symbol leuchtet während der Wiedergabe auf.
7. Dieses Symbol leuchtet im Pausenbetrieb auf.
8. Dieses Symbol leuchtet während des Programmierens auf.

TROUBLESHOOTING

What appears to be a malfunction may not always be serious.
Make sure first ...
The POWER is not applied even when the POWER button is pressed.
Is the power plug connected incorrectly?
— Connect the power plug firmly and correctly.
The search does not start even if the disc platter is retracted.
Is the disc upside down?
— Load the disc with the label facing up.
Is the disc dirty?
— Clean the surface of the disc.
Refer to "Maintenance of discs" on page 7.
Are there scratches on the surface of the disc?
— Change the disc.
Are the holder and screws for transportation removed?
— Remove them referring to BEFORE USE on page 7.

STÖRUNGSSUCHE

Nicht jede Störung ist auf einen Schaden zurückzuführen.
Zuerst überprüfen ...
Die POWER-Anzeige leuchtet nicht, obwohl die POWER-Taste gedrückt wurde.
Ist das Netzkabel nicht korrekt angeschlossen?
— Das Netzkabel fest und richtig anschließen.
Der Suchlauf startet nicht, obwohl der Disc-Halter eingefahren ist.
Liegt die Compact-Disc verkehrt herum in der Halterung?
— Die Compact-Disc richtig, mit der Etiquettenseite nach oben einlegen.
Ist die Compact-Disc verschmutzt?
— Die Oberfläche reinigen.
Siehe "Pflege von Compact-Discs" auf Seite 7.
Ist die Compact-Disc verkratzt?
— Eine andere Compact-Disc einlegen.
Sind Halter und Transportschrauben abgenommen?
— Entfernen Sie sie gemäß den Angaben unter VOR DEM BETRIEB auf Seite 7.

SPECIFICATIONS

System	:	Compact disc player
Signal detection system	:	Non-contact optical system pickup
Number of channels	:	2 channels
Frequency response	:	5 Hz — 20,000 Hz
Dynamic range	:	95 dB (1 kHz)
Signal/noise ratio	:	93 dB
Channel separation	:	90 dB (1 kHz)
Total Harmonic Distortion	:	0.004%
Wow and flutter	:	Less than measurable limit
Output level	:	2.0 Vrms (full scale)
Number of program steps	:	15 steps
Power source	:	Refer to the table on back page.
Power consumption	:	Refer to the table on back page.
Dimensions	:	435(W) x 83(H) x 288(D) mm (17-3/16" x 3-5/16" x 11-3/8")
Weight	:	3.3 kg (7.3lbs)
Accessories	:	Signal cord..... 1 Remote cable (1m) 1

Design and specifications subject to change without notice

TECHNISCHE DATEN

System	:	Compact-Disc-Player
Signal-Abtastsystem	:	Kontaktloser optischer Abnehmer
Anzahl der Kanäle	:	2
Frequenzbereich	:	5 Hz — 20,000 Hz
Dynamikbereich	:	95 dB (1 kHz)
Signalrauschabstand	:	93 dB
Kanaltrennung	:	90 dB (1 KHz)
Klirrfaktor	:	0.004%
Gleichlaufschwan kungen	:	Unterhalb der Meßgrenze
Ausgangsleistung	:	2.0 V (Maximal-Einstellung)
Programmschritte	:	15
Spannungsverso- gung	:	Siehe Tabelle auf der letzten Seite
Leistungsaufnahme	:	Siehe Tabelle auf der letzten Seite
Abmessungen	:	435(B) x 83(H) x 288(T) mm
Gewicht	:	3,3 kg
Zubehör	:	Signalkabel..... 1 Fernbedienkabel (1 m).....1

Technische Änderungen vorbehalten.

POWER SPECIFICATIONS

Areas	Line Voltage & Frequency	Power Consumption
U.S.A.	AC120V~, 60Hz	16 watts
Canada		
Continental Europe	AC220V~, 50Hz	
U.K.	AC240V~, 50Hz	
Australia		
Other areas	AC110/120/220/240V~ selectable, 50/60Hz	

SPANNUNGSVERSORGUNG UND LEISTUNGSAUFNAH

Länder	Spannung und Frequenz	Leistungsaufnahme
U.S.A.	120V~Wechselstrom, 60Hz	16 Watt
Kanada		
Kontinental-Europe	220V~Wechselstrom, 50Hz	
Großbritannien	240V~Wechselstrom, 50Hz	
Australien		
Andere Länder	110/120/220/240V~Wechselstrom(umschaltbar),50/60Hz	

CARACTERISTIQUES D'ALIMENTATION

Pays	Tension d'alimentation et fréquence	Consommation
Etats-Unis	CA120V~, 60Hz	16 watts
Canada		
Europe continentale	CA220V~, 50Hz	
Royaume-Uni	CA240V~, 50Hz	
Australie		
Autres pays	CA110/120/220/240V~commutable, 50/60Hz	

SPANNINGSVEREISTEN

Gebieden	Netspanning en frekwentie	Stroomverbruik
V.S.	120V~ wisselstroom, 50Hz	16 Watt
Canada		
Europa	220V~ wisselstroom, 50Hz	
Engeland	240V~, wisselstroom, 50Hz	
Australië		
Andere gebieden	110/120/220/240V~ wisselstroom instelbaar, 50/60Hz	

ESPECIFICACIONES DE ALIMENTACION

Areas	Voltaje y frecuencia	Consumo
EE.UU.	120V~CA, 60Hz	16 vatios
Canadá		
Europa Continental	220V~CA, 50Hz	
Reino Unido	240V~CA, 50Hz	
Australia		
Otras áreas	110/120/220/240V~ seleccionables, 50/60Hz	

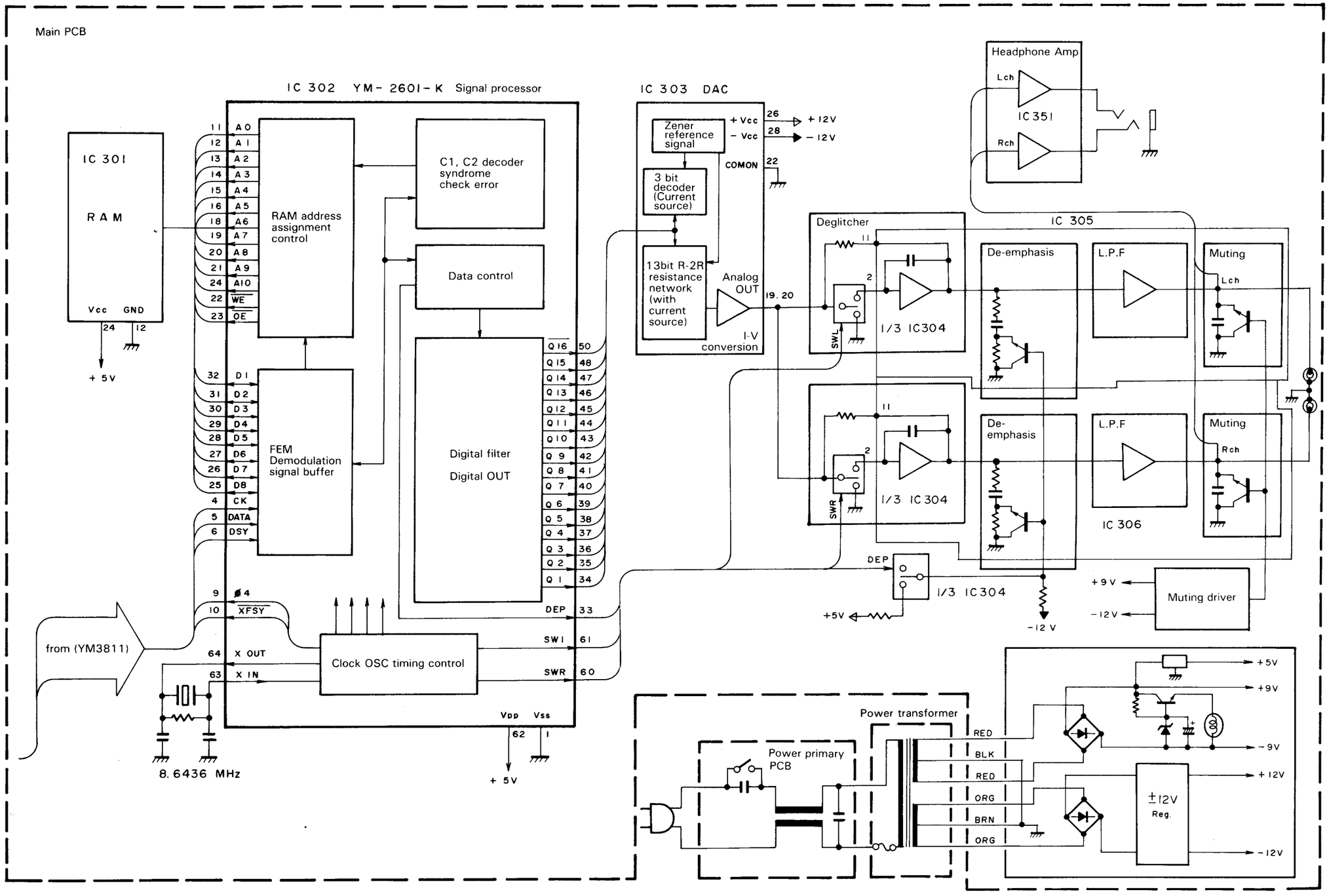
JVC

VICTOR COMPANY OF JAPAN, LIMITED

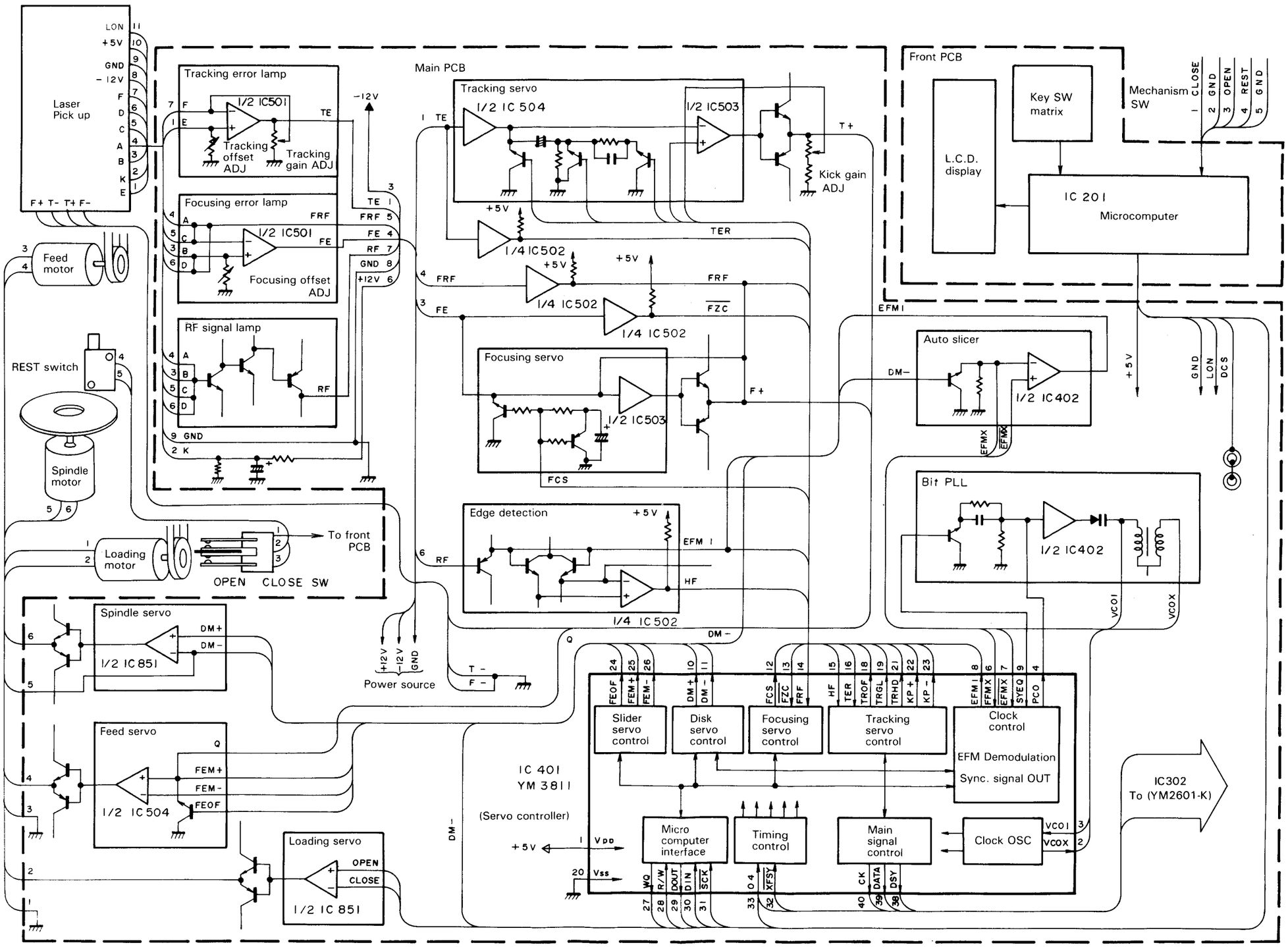
Printed in Japan

(No. 2928)

Block Diagram (Audio & Power Souce Section)



Block Diagram (Servo & Microcomputer Section)



Description of Major LSI ICs

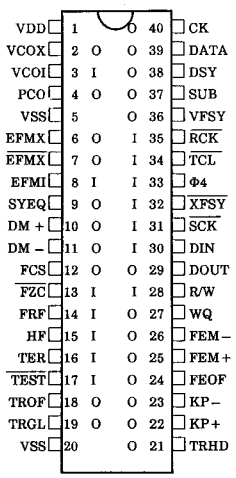
(1) YM3811 (IC401)

Outline: YM3811 is a silicon-gate CMOS LSI for CD player servo-control used with YM2601 (SGP) for demodulation of EFM signal from photo pickup and various intelligent servo-control functions (focus, spindle, tracking, feed).

Function:
1) Digitizes EFM signal, performes clock regeneration and separates sync. signal.
2) EFM demodulates the digital signal described above and outputs it to YM2601-K (SGP).
3) Separates Q sub code from the digital signal described above and outputs it to the external microprocessor after CRC checking.
4) Outputs frame phase difference signal from regenerated and standard clocks and controls speed of spindle motor.
5) Performs tracking and feed motor servo-controls for music scanning and fast foreard by input of commands from microprocessor.

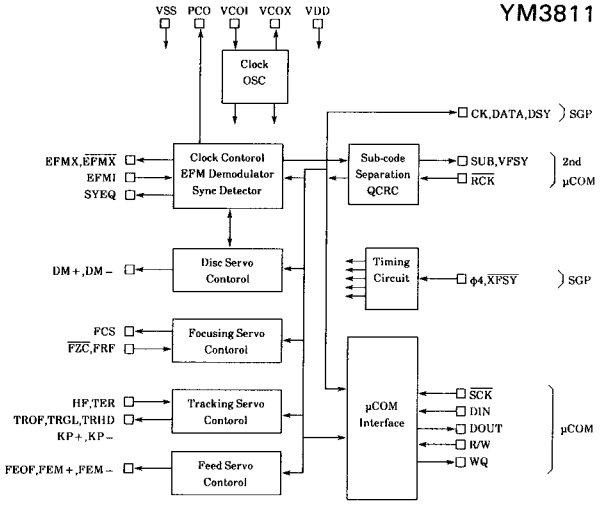
Terminal layout

YM3811


VDD 1 40 CK
VCOX 2 O O 39 DATA
VCOI 3 I O 38 DSY
PCO 4 O O 37 SUB
VSS 5 O 36 VFSY
EFMX 6 O I 35 RCK
EFMX 7 O I 34 TCL
EFMI 8 I I 33 Φ4
SYEQ 9 O I 32 XFSY
DM+ 10 O I 31 SCK
DM− 11 O I 30 DIN
FCS 12 O O 29 DOUT
FZC 13 I I 28 R/W
FRF 14 I O 27 WQ
HF 15 I O 26 FEM−
TER 16 I O 25 FEM+
TEST 17 I O 24 FEOF
TROF 18 O O 23 KP−
TRGL 19 O O 22 KP+
VSS 20 O 21 TRHD

Block diagram

YM3811



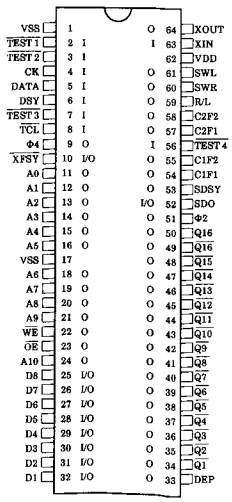
(2) YM2601-K (IC302)

Outline: YM2601 (SGP) is N channel silicon gate MOS LSI for signal processor in CD player.
Performs digital filtering for correction on digital signal and improvement of sound quality; used with YM3811 (SVC).

Function:
1) Generates standard clock oscillations and timing signals necessary for operation with external crystal oscillator.
2) Performs buffering of EFM demodulation signal for absorbing fluctuation in disc speed and exchanges signals with external RAM.
3) Unscrambles and deinterleaves by re-sequenceing digital signal from YM3811 (SVC) into a fixed sequence.
4) Performs the detection and correction of error signals and flag processing (double error correction system).
5) Performs signal interpolation, pre-hold and muting etc.
6) Performs digital filtering (signal cutoff at 20 kHz) by doubling the sampling cycle for each channel L and R to 88.2 kHz and outputs signal for DAC.

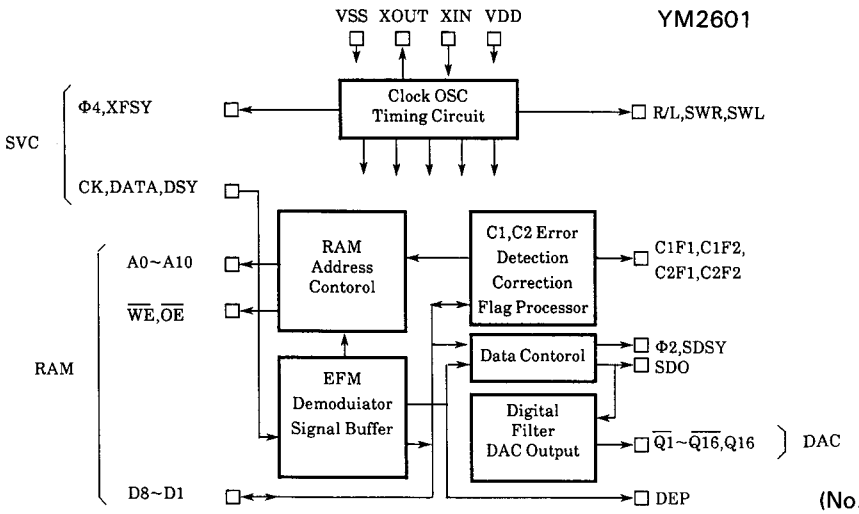
Terminal layout

YM2601-K


VSS 1 O 64 XOUT
TEST 1 2 I I 63 XIN
TEST 2 3 I 62 VDD
CK 4 I O 61 SWL
DATA 5 I O 60 SWR
DSY 6 I O 59 R/L
TEST 3 7 I O 58 C2F2
TCL 8 I O 57 C2F1
Φ4 9 O I 56 TEST 4
XFSY 10 I/O O 55 C1F2
A0 11 O O 54 C1F1
A1 12 O O 53 SDSY
A2 13 O I/O 52 SDO
A3 14 O O 51 Φ2
A4 15 O O 50 Q16
A5 16 O O 49 Q15
VSS 17 O 48 Q14
A6 18 O O 47 Q13
A7 19 O O 46 Q12
A8 20 O O 45 Q11
A9 21 O O 44 Q10
WE 22 O O 43 Q9
OE 23 O O 42 Q8
A10 24 O O 41 Q7
D8 25 I/O O 40 Q6
D7 26 I/O O 39 Q5
D6 27 I/O O 38 Q4
D5 28 I/O O 37 Q3
D4 29 I/O O 36 Q2
D3 30 I/O O 35 Q1
D2 31 I/O O 34 DEP
D1 32 I/O O 33

Block diagram

YM2601



(3) Terminal Functions of YM3811 (IC401)

No. of Terminal	Name of Terminal	I/O	Outline of Function
1	VDD	I	15 V power terminal
2 3	VCOX VCOI	O I	Connect an LC resonance circuit between these two terminals. The terminals are used for performing VCO clock oscillation (Average 8.6436 MHz).
4	PCO	O	Control output terminals for VCO clock. Set up a VCO clock oscillation circuit that raises the frequency, when the average direct current voltage is high between the terminals.
5 20	VSS VSS	I I	Ground terminal
6 7	$\overline{\text{EFMX}}$ EFMX	O O	This is an output terminal for amplification limited EFM signals. Connect it to an EFM signal slice level controller circuit.
8	EFMI	I	EFM signals (1 ~ 2 VPP) are input to this terminal.
9	SYEQ	O	This monitor output terminal becomes "H" when synchronizing signal during EFM patterning and the internal synchronizing signal match.
10 11	DM+ DM−	O O	These are PWM terminals connected to the disc motor drive circuit. Both terminals do not become "H" simultaneously.
12	FCS	O	Focus retraction output terminal.
13	$\overline{\text{FZC}}$	I+	This terminal is based on the focus error signal. When the focus point comes, the signal which becomes "L" is input to this terminal.
14	FRF	I	"H" signals are input to this terminal, when it is exposed to reflected light.
15	HF	I	EFM envelope signals (amplitude logic level) are input to this terminal.
16	TER	I	Tracking error signals (amplitude logic level) are input to this terminal.
17 34	$\overline{\text{TEST}}$ $\overline{\text{TCL}}$	I+ I+	A test terminal with built-in pull-up resistor. Non-connected.
18	TROF	O	This output terminal turns off the tracking error signal of the tracking servo circuit.
19	TRGL	O	This output terminal lowers the gain of the tracking servo circuit.
21	TRHD	O	This output terminal holds the tracking error signal of the tracking servo circuit while the KP+ and KP− terminals(below) are performing output operations.
22 23	KP+ KP−	O O	These terminals perform tracking operations and should be connected to the tracking servo circuit.
24	FEOF	O	This output terminal turns off the input signal to the feed servo circuit.
25 26	FEM+ FEM−	O O	These output terminals are used for high-speed feed operations and should be connected to the feed servo circuit.
27	WQ	O	This request output terminal is used for requesting transmission of data from the SVC to the μCOM and should be connected to the μCOM.
28	R/W	I	This output terminal performs switching of data transmission and should be connected to the μCOM. When the R/W terminal is "L", data is transferred from the SYC to the μCOM and in the opposite direction when the terminal is "H".
29	DOUT	O	Connect this data output terminal the μCOM. When R/W is "L", data is transferred from SYC to μCOM according to SCK clock input.
30	DIN	I	Connect this data input terminal to the μCOM. When R/W is "H", data is transferred from μCOM to SYC according to SCK clock input.
31	$\overline{\text{SCK}}$	I	This clock input terminal is essential for data transmission and should be connected to the μCOM.
32	$\overline{\text{XFSY}}$	I	This input terminal for frame synchronizing signals (7.35 kHz) should be connected to the SGP output.
33	ϕ4	I	This input terminal for the quartz clock (4.3218 MHz) should be connected to the SGP output.
35	$\overline{\text{RCK}}$	I+	This clock input terminal is essential for subcode transmissions and should be connected to the μCOM. The terminal is non-connected when not in use.
36	VFSY	O	This output terminal for VCO frame synchronizing signals (Average 7.35 kHz) should be connected to the μCOM. The terminal detects "H" → "L" changes and can be used as a request signal to request transmission of subcode from SYN to μCOM.
37	SUB	O	Connect this subcode output terminal to the μCOM. It transfers the subcode from SYC to μCOM according to RCK clock input.
38	DSY	O	Connect this synchronizing signal output terminal for serial signals (See below) to the SCP input.
39	DATA	O	This is an output terminal for serial signals such as 8-bit EFM modulated and 5-bit control signals. The terminal should be connected to the SGP input.
40	CK	O	Connect this output terminal for the VOC clock (Average 4.3218 MHz) to the SGP input.

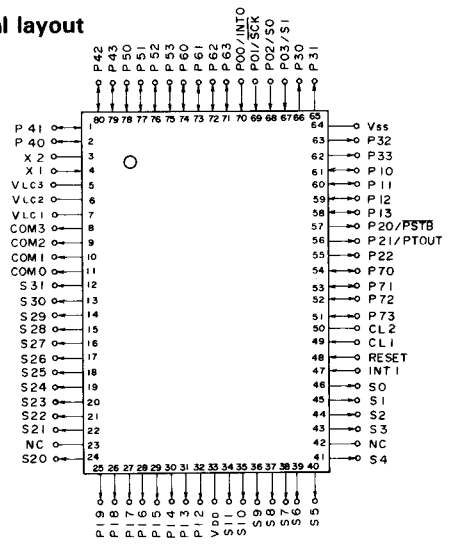
(4) Terminal Functions of YM2601-K (IC302)

No. of Terminal	Name of Terminal	I/O	Outline of Function
1 17	VSS VSS	I I	Ground terminal
2 3 7 8	$\overline{TEST1}$ $\overline{TEST2}$ $\overline{TEST3}$ $\overline{TCL}$	I+ I+ I+ I+	Test terminal with built-in resistor. A non-contact type terminal.
4	CK	I	Connect this VCO clock (Average 4.3218 MHz) input terminal to the SVC output.
5	DATA	I	This is an input terminal for serial signals such as 8-bit EFM modulated and 5-bit control signals. Connect it to the SYC output.
6	DSY	I	Connect this synchronizing signal output terminal for serial signals (See above) to the SYC output.
9	ϕ4	O	Connect this output terminal for the quartz clock (4.3218 MHz) to the SYC input.
10	$\overline{XFSY}$	I/O	Connect this output terminal for frame synchronizing signals to the SYC input. (If the terminal is set to "Level L" during a test, synchronizing signals can be recovered.)
11 12 13 14 15 16 18 19 20 21 24	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10	O O O O O O O O O O O	Connect this address output terminal to the RAM address terminal.
22	$\overline{WE}$	O	Connect this terminal to the RAM WE terminal. At "level L" the RAM is in write mode.
23	$\overline{OE}$	O	Connect this terminal to the RAM OE terminal. At "level L" the RAM is in read mode.
25 26 27 28 29 30 31 32	D8 D7 D6 D5 D4 D3 D2 D1	I/O I/O I/O I/O I/O I/O I/O I/O	Connect this data input terminal to the RAM data terminal. The terminal is in output mode during WE = "L" cycle and in input mode during WE = "H" cycle.
33	DEP	O	An output terminal for frequency characteristic switching signals of the audio filter. De-emphasis is required during "H" mode.
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	$\overline{Q1}$ $\overline{Q2}$ $\overline{Q3}$ $\overline{Q4}$ $\overline{Q5}$ $\overline{Q6}$ $\overline{Q7}$ $\overline{Q8}$ $\overline{Q9}$ $\overline{Q10}$ $\overline{Q11}$ $\overline{Q12}$ $\overline{Q13}$ $\overline{Q14}$ $\overline{Q15}$ $\overline{Q16}$ Q16	O O O O O O O O O O O O O O O O O	This terminal serves to output parallel signals that have passed through the built-in digital filter. Connect it to the DAC input. Left and right channels are output alternately at a rate of 88.2 kHz per channel. Connect either Q16 or $\overline{Q16}$ depending on which DAC input is to be used.
51	ϕ2	O	Output terminal for quartz clock (2.1609 MHz)
52	SDO	I/O	Output terminal for DAC serial signals. Signals are output from the LSB at ϕ clock bit rate of 24 bits for right channel and 25 bits for left channel.
53	SDSY	O	Synchronizing signal output terminal for above serial signals. The terminal is "H" during left channel output and "L" during right channel output.
56	$\overline{TEST4}$	I+	A test terminal with built-in pull-up resistor. This terminal is normally a non-contact terminal. If set to "L", it is possible to put serial signals coming from the SDO terminal through the digital filter provided that these signals are identical in format to above serial signals.
54 55 57 58	C1F1 C1F2 C2F1 C2F2	O O O O	This monitor output terminal displays the operating condition of C1 and C2 error-correction.
59	R/L	O	This is an output terminal for channel distribution signals of DAC analog output. Right channel is "H" and left channel is "L".
60 61	SWR SWL	O O	This is an output terminal for deglitch signals for each channel of DAC analog output.
62	VDD	I	A +5 V power terminal
63 64	XIN XOUT	I O	Connect the quartz to these terminals. They are used for performing quartz clock (8.6436 MHz) oscilloations.

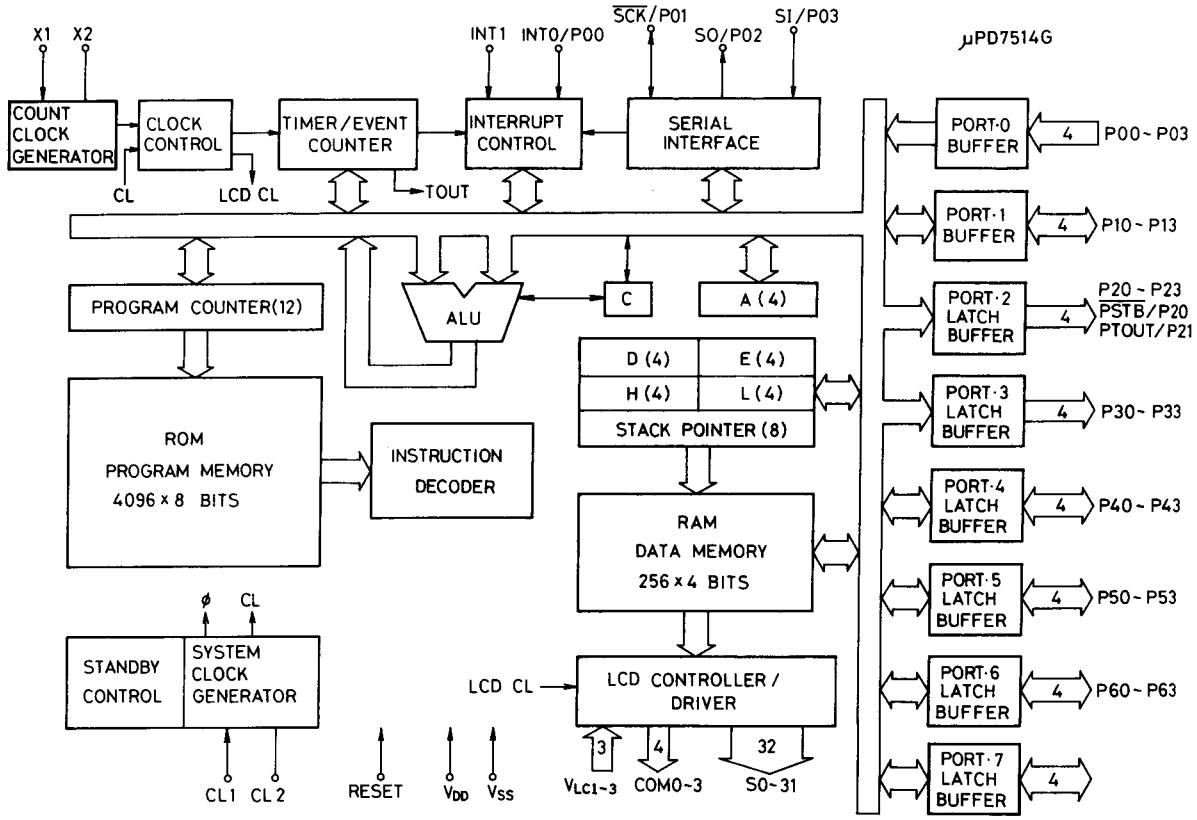
(5) μPD7514G (IC201)

Outline: This IC is C-MOS 4-bit single chip microprocessor with 4096 word × 8-bit ROM, 256 digit × 4-bit RAM, In/Out, Timer/Counter and Serial Interface. The main functions of IC command the operation to LCD drive, servo control, mechanism control, etc. and accept the signal from operation switches.

Terminal layout


P42 P43 P50 P51 P52 P53 P60 P61 P62 P63 P00/INT0 P01/SCK P02/SO P03/SI P30 P31
P41 P40 X2 X1 VLC3 VLC2 VLC1 COM3 COM2 COM1 COM0 S31 S30 S29 S28 S27 S26 S25 S24 S23 S22 S21 NC S20
Vss P32 P33 P10 P11 P12 P13 P20/PSTB P21/PTOUT P22 P70 P71 P72 P73 CL2 CL1 RESET INT1 SO SI S2 S3 NC S4
P19 P18 P17 P16 P15 P14 P13 P12 VDD S11 S10 S9 S8 S7 S6 S5

Internal block diagram



Key matrix

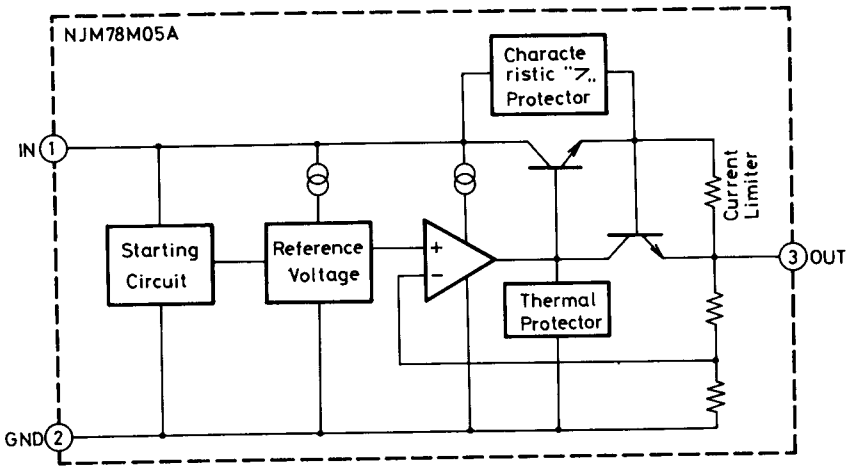
		3 <R43>	2 <R42>	1 <R41>	0 <R40>
0	<R30>	OPEN CLOSE	—	STOP CLEAR	PLAY PAUSE
1	<R31>	— —	— —	SKIP L	SKIP R
2	<R32>	— —	— —	MANUAL SERACH L	MANUAL SEARCH R
3	<R33>	— —	— —	PROGRAM	REPEAT

(6) Terminal Functions of μPD7514G (IC201)

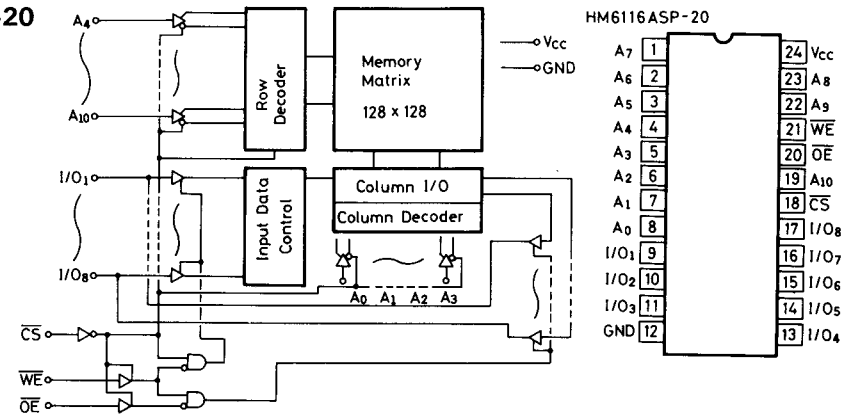
PIN No.	NAME	I/O	ACTIVE	Function
1	P41	I	H	KEY MATRIX INPUT 1
2	P40	I	H	0
3	X2	—	—	NO-USE [OPEN]
4	X1	—	—	[Vss or GND]
5	VLC3	—	—	LCD POWER SUPPLY
6	VLC2	—	—	
7	VLC1	—	—	
8	COM3	—	—	NO-USE [OPEN]
9	COM2	—	—	[OPEN]
10	COM1	O	H	COMMON OUT 1
11	COM0	O	H	2
12	S31	—	—	NO-USE [OPEN]
≀	≀	≀	≀	≀
19	S24	—	—	NO-USE [OPEN]
20	S23	O	H	SEGMENT OUT 23
≀	≀	≀	≀	≀
22	S21	O	H	SEGMENT OUT 21
23	NC	—	—	[OPEN]
24	S20	O	H	SEGMENT OUT 20
≀	≀	≀	≀	≀
32	S12	O	H	SEGMENT OUT 12
33	Vdd	—	—	POWER SUPPLY +5V
34	S11	O	H	SEGMENT OUT 11
≀	≀	≀	≀	≀
41	S4	O	H	SEGMENT OUT 4
42	NC	—	—	[OPEN]
43	S3	O	H	SEGMENT OUT 3
≀	≀	≀	≀	≀
46	S0	O	H	SEGMENT OUT 0
47	INT1	I	—	NO-USE [Vss]
48	RESET	—	H	RESET INPUT H-ACTIVE
49	CL1	—	—	C-R OSCILLTOR
50	CL2	—	—	
*51	*P73	*O	*H	*CD-ROM OUT
*52	*P72	*O	*H	*MODE OUT PLAY-SEARCH
*53	*P71	*O	*H	*MODE OUT STOP-SEARCH
54	P70	O	L	DISPLAY ACTIVE
55	P22	O	H	TLOF
56	P21	O	H	GU
57	P20	O	H	SVC CONNECT R/W
58	P13	I	H	WQ
59	P12	I	L	TEST2 CLOCK OUT (PULL UP)
60	P11	I	L	TEST1 TIME OUT OFF (PULL UP)
61	P10	I	H	DM-
62	P33	O	H	KEY MATRIX OUT 3
63	P32	O	H	2
64	Vss	—	—	GND
65	P31	O	H	KEY MATRIX OUT 1
66	P30	O	H	0
67	P03	I	H	SVC CONNECT D-OUT
68	P02	O	H	D-IN
69	P01	O	L	SCK
70	P00	—	—	NO-USE [Vss]
71	P63	O	H	LASER ON (H-Active)
72	P62	O	H	CLOSE OUT
73	P61	O	H	OPEN OUT
74	P60	O	L	DCS OUT (L-Active)
75	P53	I	H	REST SW
76	P52	I	H	OPEN SW
77	P51	I	H	CLOSE SW
78	P50	I	L	DCS INPUT (L-Active)
79	P43	I	H	KEY MATRIX IN 3
80	P42	I	H	2

Other LSI ICs and Internal Block Diagrams

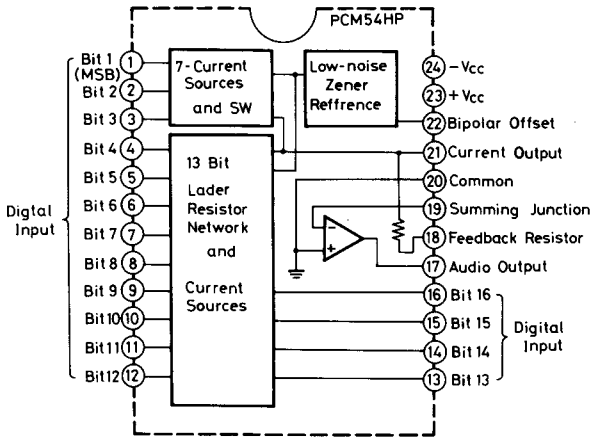
IC101: NJM78M05A
(Voltage regulator)



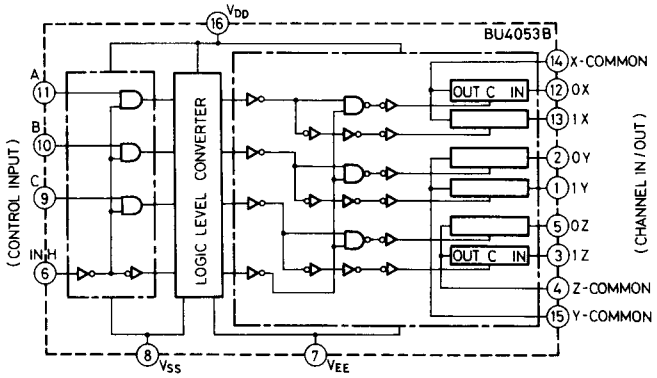
IC301: HM6116ASP-20
(Static RAM)



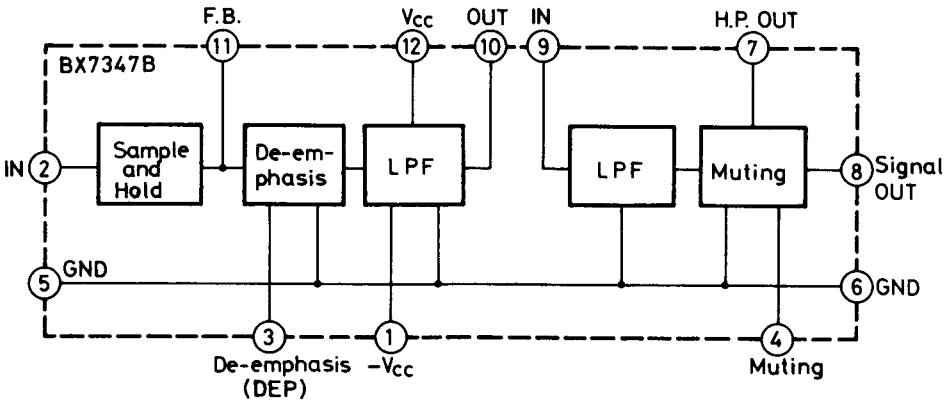
IC303: PCM54HP
(D/A converter)



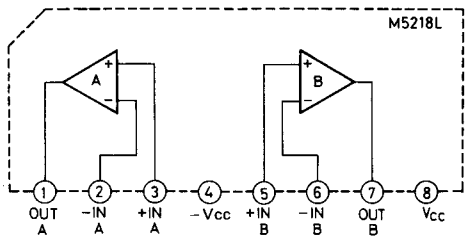
IC304: BU4053B
(Analog switch)
(Multiplexer)



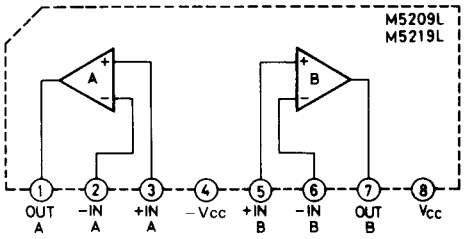
IC305, IC306: BX7347B
(Low-pass filter)



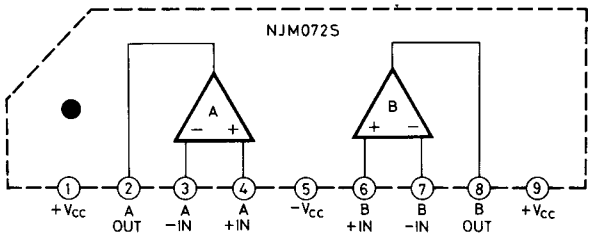
IC351: M5218L
(Dual op amp.)



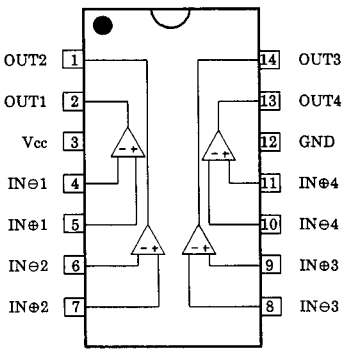
IC402: M5209L or M5219L
(Dual op amp.)



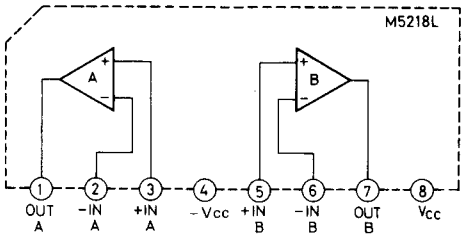
IC501: NJM072S
(Dual op amp.)



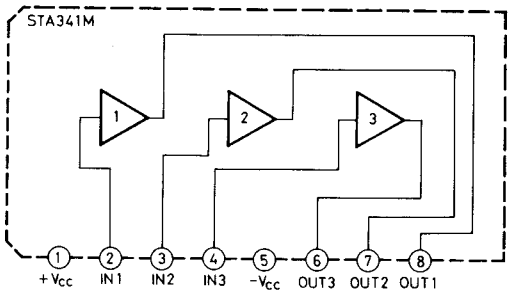
IC502: NJM2901N
(Quad comparator)



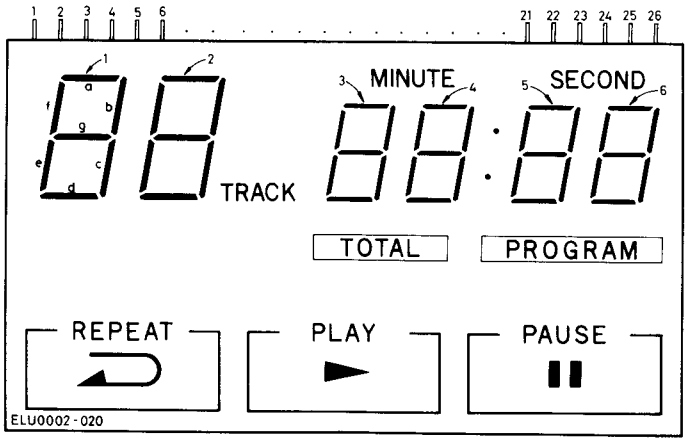
IC503, IC504, IC851: M5218L
(Dual op amp.)



IC801: STA341M
(Power op amp.)
(Driver array)



LC201: ELU0002-020
(Liquid crystal display)



Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
COM0	1a	1f	1d	1e	2a	2f	2d	2e	3a	3f	3d	3e	4a
COM1	TOTAL	1b	1c	1g	▶	2b	2c	2g	▮▮	3b	3c	3g	PROG.

Pin No.	14	15	16	17	18	19	20	21	22	23	24	25	26
COM0	4f	4d	4e	5a	5f	5d	5e	6a	6f	6d	6b	COM0	—
COM1	4b	4c	4g	Constant light-on	5b	5c	5g	↩	6b	6c	6g	—	COM1

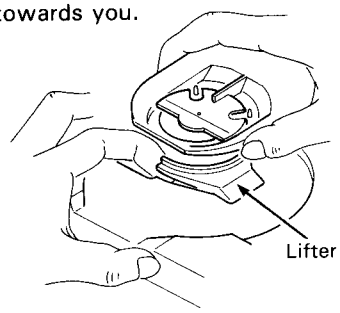
Disassembly Procedures

(1) Metal cover removal

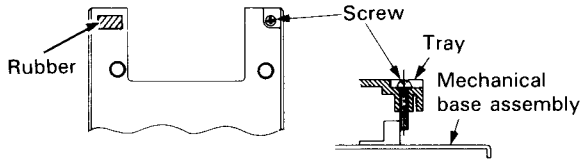
1. Remove the 5 screws.
2. Remove the cover top by lifting it and pulling it diagonally rearwards.
3. If difficult to remove, lift the front portion of the metal cover from the rear and the cover can easily be removed.

(2) Tray assembly removal

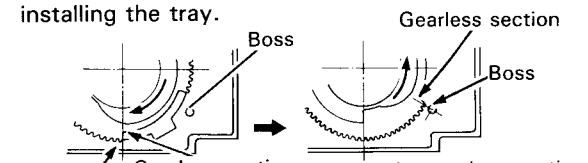
1. Remove the metal cover.
2. Turn on the power, press the Open/Close switch and pull out the tray. Then turn off the power.
   * If the power cannot be turned on due to a breakdown, raise the lifter with your fingers and pull the tray towards you.



3. Remove the tray stopper screw and remove the tray by pulling it towards you. (Remove the rubber.)

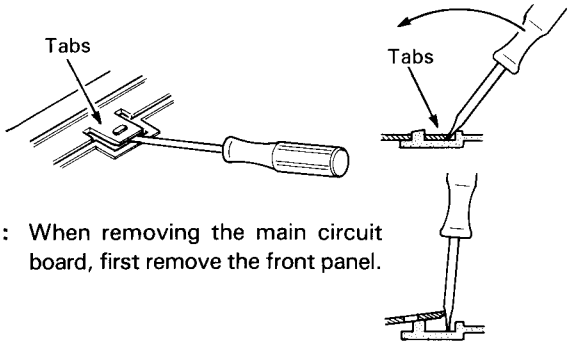


4. Rotate the gearless section of the main gear to the left, then rotate it back to the right and mate it with the boss of the mechabase (visual inspection) before installing the tray.


Boss
Gearless section
Gearless section
Boss
Rotate the gearless section of the main gear to the left
Rotate the gearless section back to the right and mate it with the boss.

(3) Front panel assembly removal

1. Remove the tray assembly.
2. Remove the 3 screws.
3. Remove the 3 tabs at the bottom. Raise the tabs with a straight-bladed screwdriver and pull the front panel towards you. Be sure not to damage the chassis.



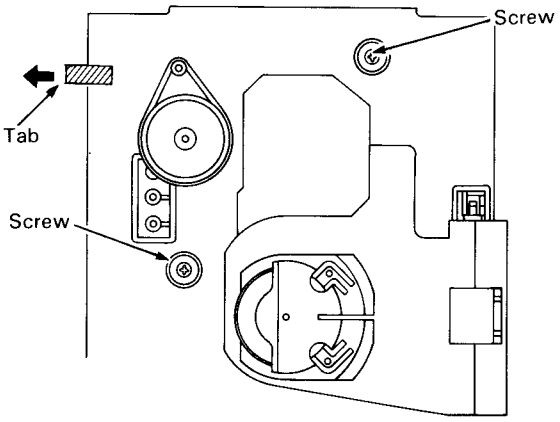
Note: When removing the main circuit board, first remove the front panel.

(4) LCD printed circuit board removal

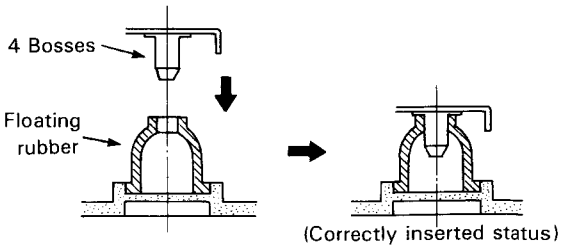
1. Remove the 2 plastic rivets.
2. Remove the circuit board by sliding it rearwards.
3. Do not soil the LCD surface by touching it. → See "LCD Precautions" page 1-17.

(5) Mechanical assembly removal

1. Remove the tray assembly.
2. Remove the 2 screws.

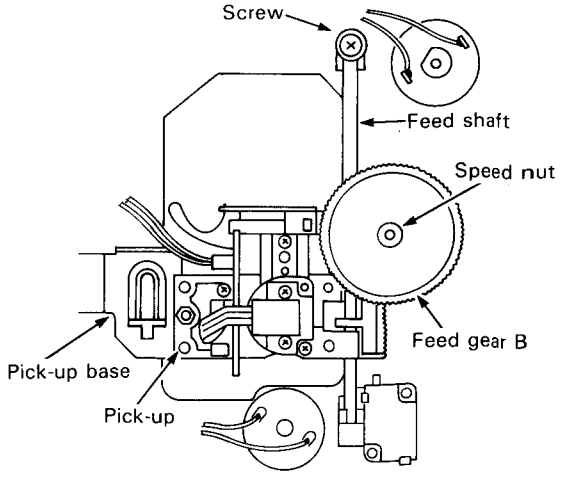


3. After removing the tab on the left side of the chassis, remove the assembly by lifting it straight up and sliding it slightly rearwards.
4. Make sure that the 4 bosses at the rear of the mechanical assembly are correctly positioned in the floating rubber of the chassis when the assembly is re-installed. It is particularly important that the front right part is correctly secured.



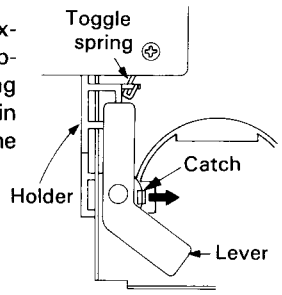
(6) Laser pick-up removal

1. Remove the speed nut and remove feed gear B.
2. Remove the feed shaft lock screw and remove the feed shaft with the pick-up.
3. Remove the pick-up from the pick-up base.

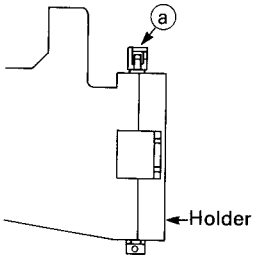


(7) Spindle motor removal

1. First demount the tray assembly.
2. Detach the lever.
   The lever can be extracted by pulling it upward while pushing the catch (shown in the figure below) in the arrow direction.

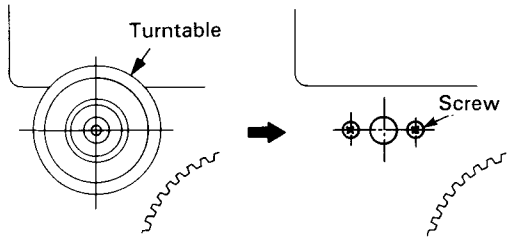


3. Detach the holder from point (a).



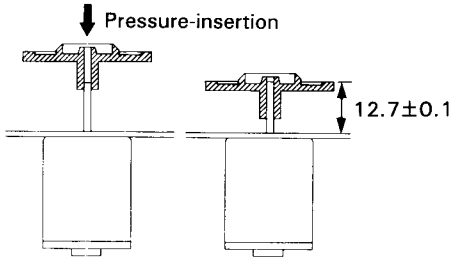
Note: After the holder has been reinstalled, correctly replace the toggle spring (shown in the figure under (7)-2.)

4. Extract the turntable and remove the two screws.

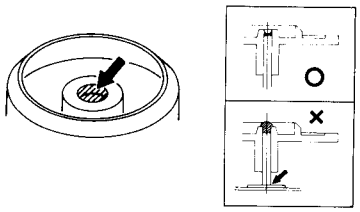


Note: Installation of spindle motor

1. Replace the two screws by applying uniform tightening torque.
2. Pressure-insert the turntable. Straight insertion must be made while supporting the motor at its lowest section, and accurate alignment must be achieved to obtain its height of 12.7 mm ±0.1 mm from the mechanical base top surface.



3. After pressure-insertion is made, bond the motor shaft and turntable together (arrow-mark section on the left-hand figure below). Use the bonding agent of "LOCTITE #460" while limiting the applied volume to a minimum. Exercise care not to cause surplus bonding agent to pile up on the turntable, as shown in the lower-side figure. Absolutely avoid causing the bonding agent to attach to the motor bearings (arrow-mark section on the right-hand figure above.).

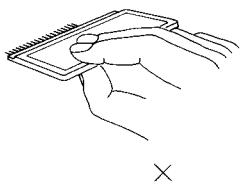


LCD Panel Handling Precautions

The LCD (Liquid Crystal Display) panel employed in this device requires the following handling precautions.

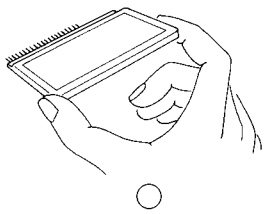
1. Since the LCD is made of plate glass, never apply strong mechanical force to it.

   Do not forcibly press the light-polarizing plate.



×

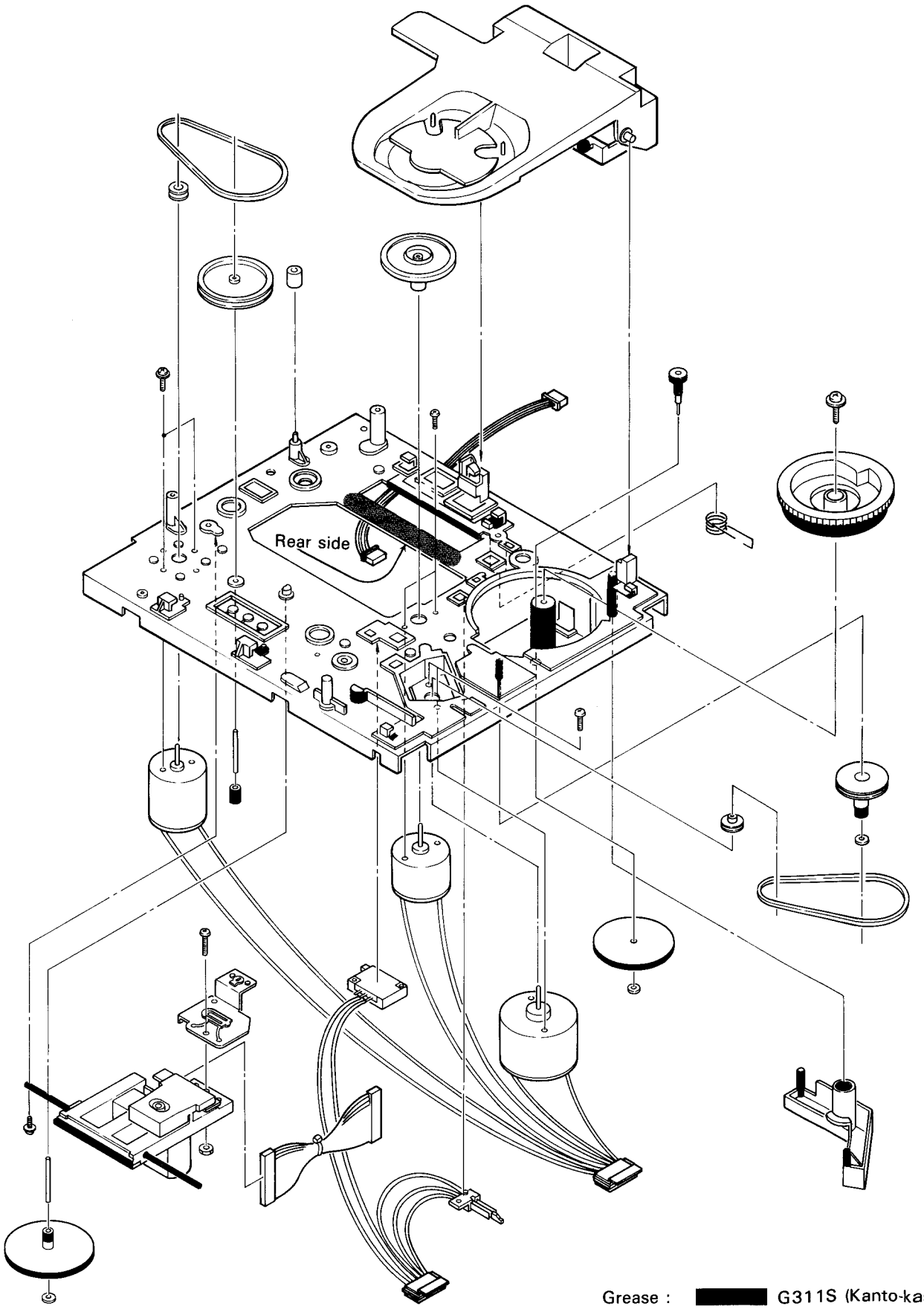
When handling, grip it as shown in the figure below.



○

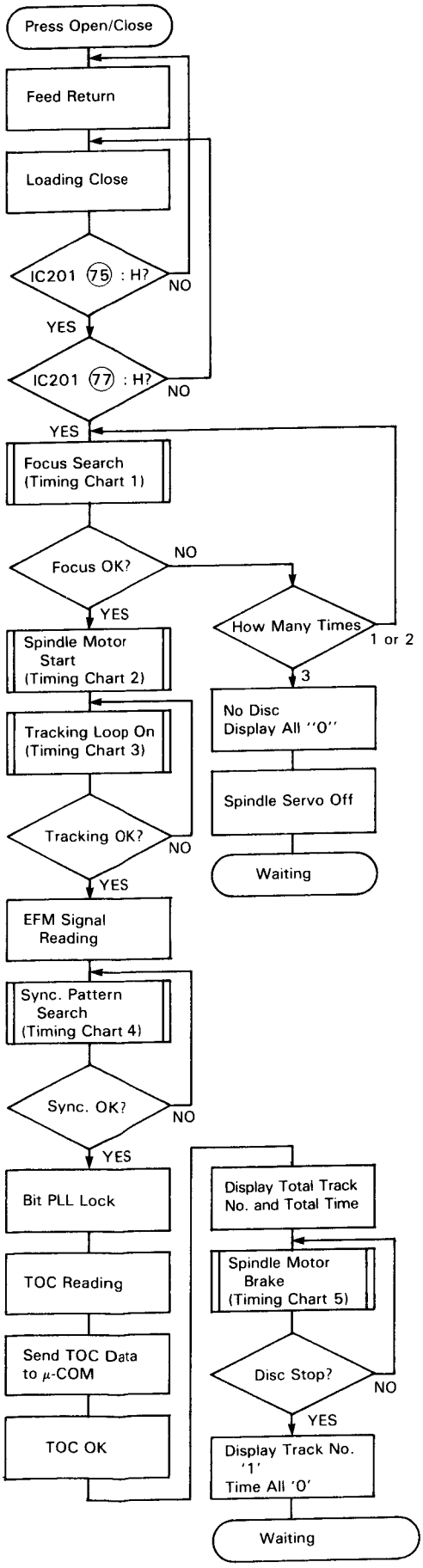
2. When handling the LCD, wear gloves whenever possible.
3. When the light-polariziang plate (surface other than silk-printed areas) becomes contaminated, use an applicator moistened with isoproply alcohol to gently wipe it clean. As for the silk-printed areas, use a soft cloth to gently wipe it clean.
   Note: The light-polarizing plate attached to the LCD surface and the silk-printed areas are made of soft material.
4. As much as possible, avoid exposing the LCD to harmful light irradiation (direct sunlight or ultraviolet rays), especially when the device is not in use.
5. Do not imprint DC voltage on pins of the LCD (its characteristics will be degraded).
6. When the LCD is damaged, resulting in leakage of liquid crystal, be very cautions to keep the liquid away from one's mouth or swallowing it. Should liquid crystal contact the hands or clothing, immediately wash with water, using soap or other appropriate cleanser.

Application Points for Grease

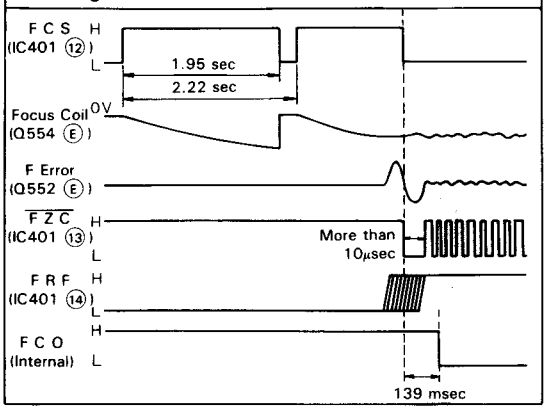


Grease : ■ G311S (Kanto-kasei)
Silicon oil : ● KF96H 10,000 cs (Shin-etsu-kagaku)

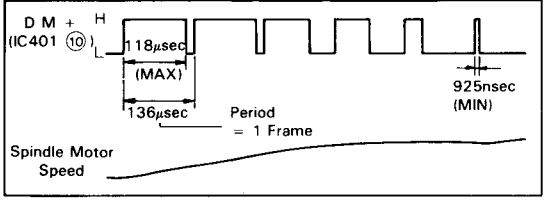
Timing Chart for TOC Reading



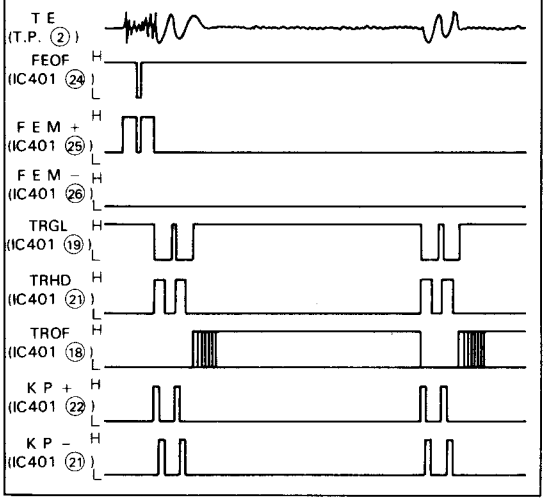
Timing Chart 1. Focus Search



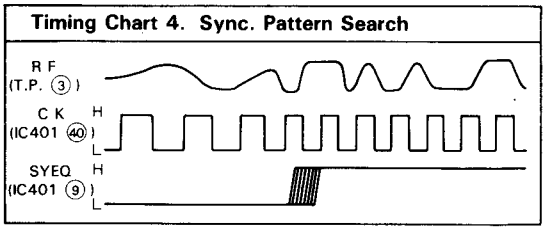
Timing Chart 2. Spindle Motor Start



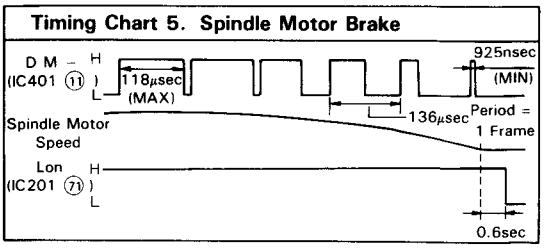
Timing Chart 3. Tracking Loop On



Timing Chart 4. Sync. Pattern Search



Timing Chart 5. Spindle Motor Brake



Maintenance of Laser Pickup

(1) Service life of the laser pickup

1) Turn the power on after connecting FW102 pin ④ on the front PCB (ENN-045) to +5 V point.
2) Measure the laser power with the laser power meter.
3) Measure the EFM output if a laser power meter is not available.
4) When the measured value is as shown in the table below, replace the pickup because the service life of the laser diode is judged as having expired.

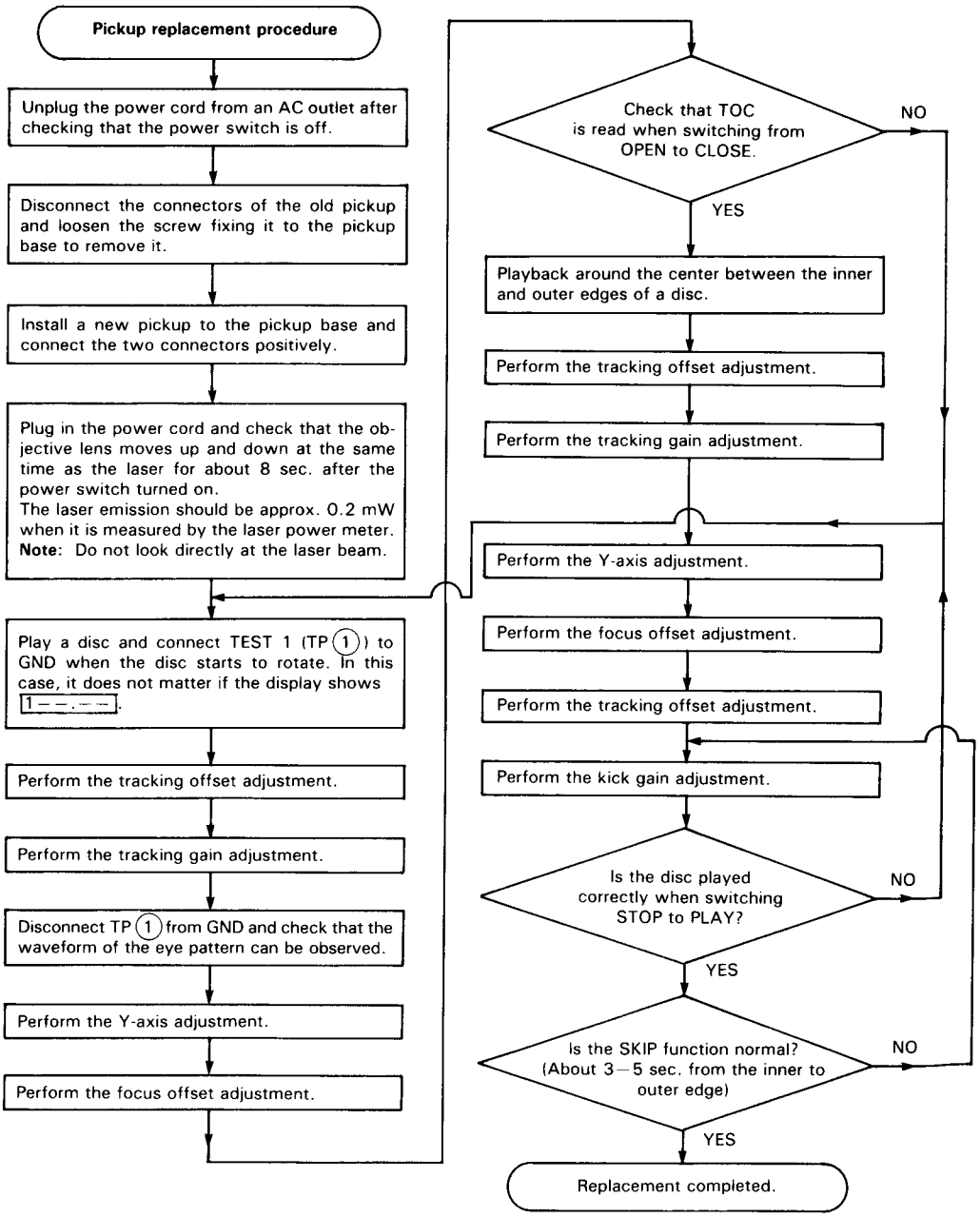
Measurement value	Measurement instrument	Measured value
Laser power	Laser power meter	Less than 0.1 mW
EFM output (Amplitude of eye pattern)	Oscilloscope	Less than 1.7 V

(2) Semifixed resistor on the APC board

The semifixed resistor on the APC board installed with the pickup is for the laser power adjustment. Do not touch the semifixed resistor because this adjustment should be performed as part of a pair of adjustments to match the characteristics of the optical block.
If the laser power is too low, replace the pickup because the service life of the laser diode has expired.
Turning the semifixed resistor for a normal pickup may damage the pickup because of overcurrent.

(3) Grating adjustment

Since all parts have been carefully adjusted before assembly, a grating adjustment is not required.
As parts become unadjusted, the laser beam/s will start to mistrack and sound reproduction may become impossible.


Pickup replacement procedure
Unplug the power cord from an AC outlet after checking that the power switch is off.
Disconnect the connectors of the old pickup and loosen the screw fixing it to the pickup base to remove it.
Install a new pickup to the pickup base and connect the two connectors positively.
Plug in the power cord and check that the objective lens moves up and down at the same time as the laser for about 8 sec. after the power switch turned on.
The laser emission should be approx. 0.2 mW when it is measured by the laser power meter.
Note: Do not look directly at the laser beam.
Play a disc and connect TEST 1 (TP ①) to GND when the disc starts to rotate. In this case, it does not matter if the display shows 1--.--.
Perform the tracking offset adjustment.
Perform the tracking gain adjustment.
Disconnect TP ① from GND and check that the waveform of the eye pattern can be observed.
Perform the Y-axis adjustment.
Perform the focus offset adjustment.
Check that TOC is read when switching from OPEN to CLOSE.
NO
YES
Playback around the center between the inner and outer edges of a disc.
Perform the tracking offset adjustment.
Perform the tracking gain adjustment.
Perform the Y-axis adjustment.
Perform the focus offset adjustment.
Perform the tracking offset adjustment.
Perform the kick gain adjustment.
Is the disc played correctly when switching STOP to PLAY?
NO
YES
Is the SKIP function normal? (About 3—5 sec. from the inner to outer edge)
NO
YES
Replacement completed.

Adjustment Procedures

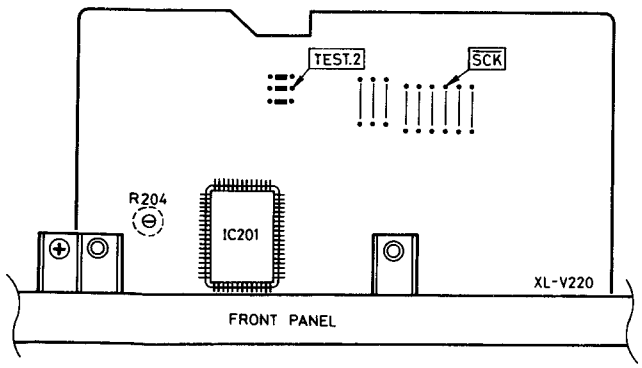
(1) PLL freerun adjustment

1) Adjustment instrument
   Frequency counter
2) Adjustment procedure
   1. Remove the tray assembly and the front panel assembly. (Refer to item (2) and (3) on page 1-16.)
   2. Connect the frequency counter between ENN-044 IC401 Pin ㊵ and GND.
   3. Short the TP3 (RF) and GND (TP4).
   4. Adjust the L401 to 4.322±0.001 MHz indicated on the frequency counter with the regulating rod.
   5. Perform this checking no sooner than switching on the power.

(2) Clock frequency adjustment

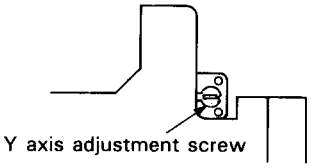
1) Adjustment instruments
   Frequency counter
2) Adjusting procedure
   Adjust the clock frequency after replacing the IC201 as follows:
   1. Remove the tray assembly and the front panel assembly. (Refer to item (2) and (3) on page 1-16.)
   2. Connect the TEST 2 point of ENN-045-1 to ground.
   3. Connect the frequency counter between $\overline{SCK}$ and ground.
   4. Set the power switch to on.
   5. Rotate R204 until the counter frequency display shows a reading of 200 kHz ±4 kHz.
   6. Set the power switch to off.
   7. Disconnect Test 2 from ground (terminal).

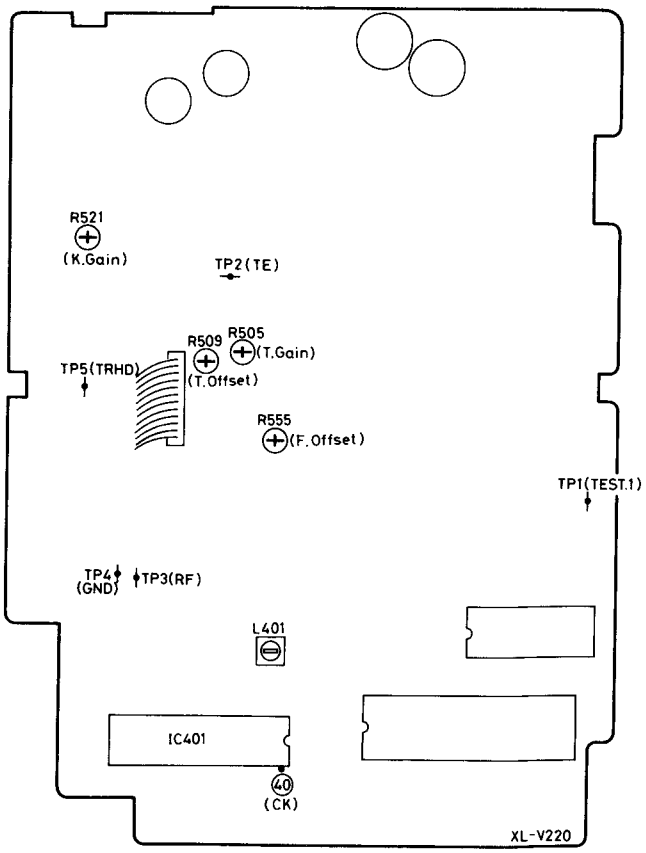
Note: When connectint to the TEST 2 point, use the resistance lead on the parts side.



(3) Y Axis adjustment

1) Adjustment instrument
   Oscilloscope, Straight-bladed screwdriver, Normal disc
2) Adjustment procedure
   1. Remove the tray assembly and the front panel assembly. (Refer to item (2) and (3) on page 1-16.)
   2. Connect the oscilloscope between EEN-044 TP3 (RF) and GND (TP4).
   3. Play the disc.
   4. Drive the Y axis adjustment screw over the pickup base, and find the point where the RF signal (waveform on the oscilloscope) becomes maximum amplitude and the finest waveform.
   5. This adjustment performs inner area of the disc.
   6. Advance the pickup to the outer track and make sure that the amplitude doesn't come down 2/3 below of inner track.



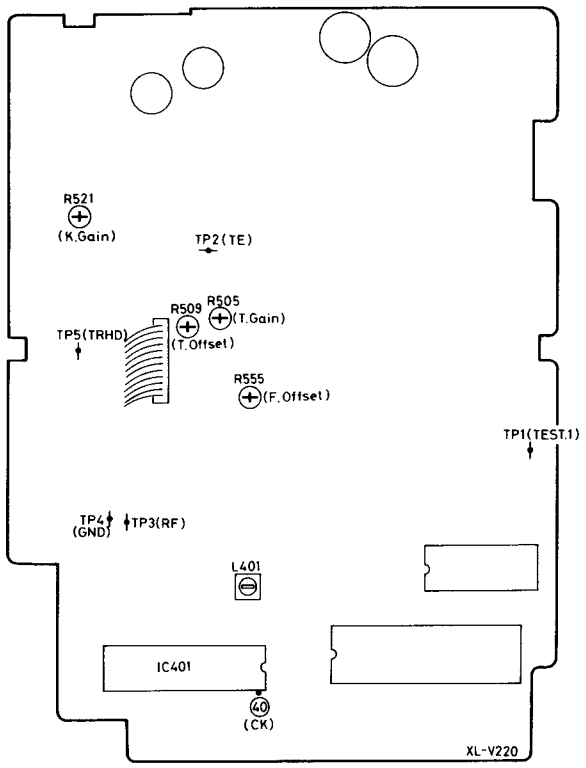


(4) Focusing offset adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-044 TP3 (RF) and GND.
   2. Play the disc.
   3. Adjust the R555 as the RF signal (waveform on the oscilloscope) becomes maximum amplitude and the finest waveform.

(5) Tracking gain adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc
2) Adjustment procedure
   1.Connect the oscilloscope between ENN-044 TP2 (TE) and GND.
   2. Play the disc.
   3. Short the TP1 (TEST. 1) to GND.
   4. Adjust the R505 as the tracking error signal (waveform on the oscilloscope) becomes 2 Vp-p.



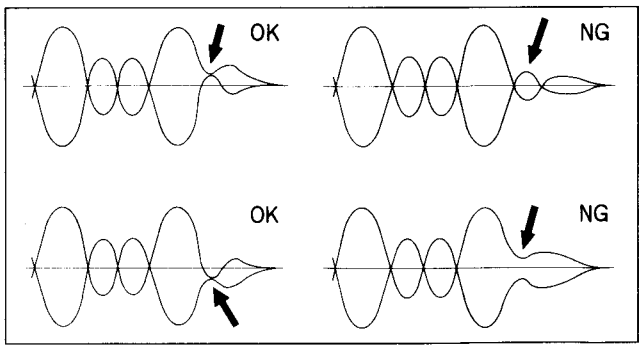
(6) Tracking offset adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc.
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-044 TP2 (TE) and GND.
   2. Play the disc.
   3. Short the TP1 (TEST. 1) to GND.
   4. Adjust the R509 as making the tracking error signal (waveform on the oscilloscope) that the DC level is 0.

Note: Adjust R509 so that the waveform upper and lower points become symmetrical with the 0 level.

(7) Kick gain adjustment

1) Adjustment instrument
   Oscilloscope (2ch), Normal disc.
2) Adjustment procedure
   1. Connect the ch1 of oscilloscope between ENN-044 TP2 (TE) and GND, the ch2 of oscilloscope between TP5 (TRHD) and GND.
   2. Turn the oscilloscope Normal mode with triggered by the ch2.
   3. Play the disc.
   4. Play back the last number recorded on a disk and press the PAUSE button in mid course. At this time, observing an oscilloscope adjust VR521 to obtain the correct waveform as shown in the figure below.

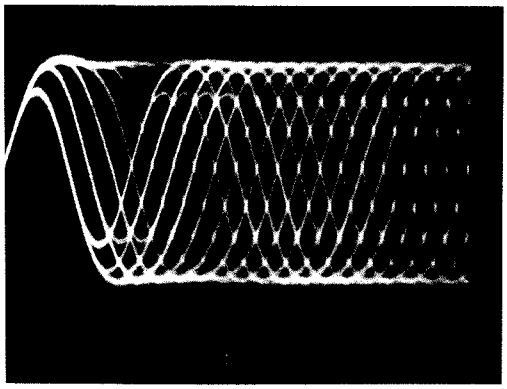


0.2 ms/div. 0.5 V/div.

Note: (1) Adjust VR521 so that the fifth peaks (pointed out by the arrow mark in the figure) are tangent each other. If they are crossing or separating each other, continue the adjustment to obtain the best result.
(2) Observe the waveform by using channel 1 of the oscilloscope. At that time, also connect channel 2 of the oscilloscope.

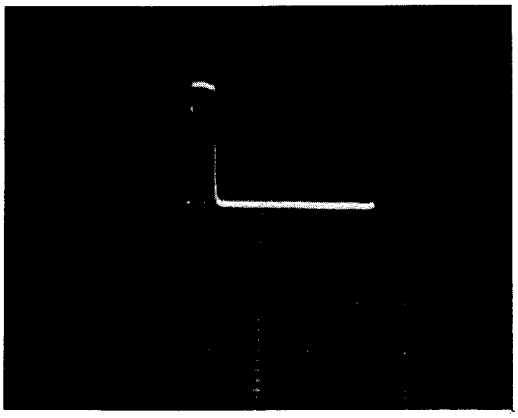
Important Waveforms

1. Eye pattern (RF signal)
TP3 (RF); standard eye pattern.



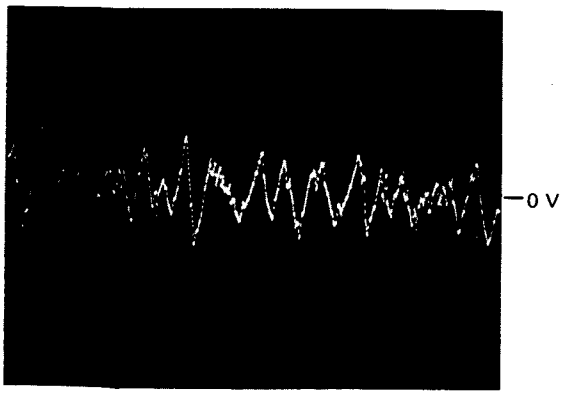
0.5 μs/div 0.5 V/div

2. Reset signal of microcomputer
Q204 collector



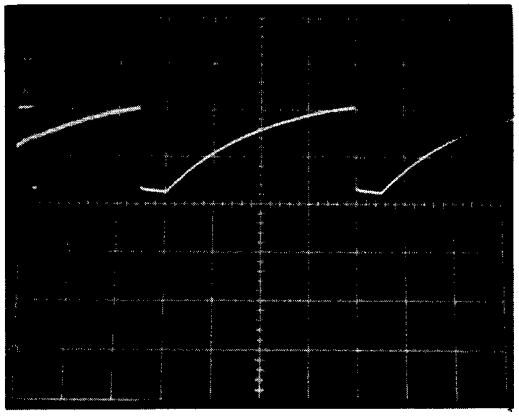
0.5 s/div 2 V/div

3. Focus signal during play
Q554 emitter; operates with period of about 0.2—1 ms.



1 ms/div 0.5 V/div

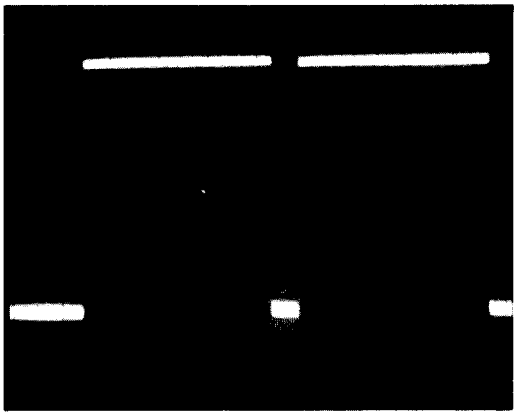
4. Focus search voltage
Voltage across C555; the waveform lens is moved up and down by this voltage when the platter is loaded without a disc.



0.5 s/div 2 V/div

5. Pulse for focus search voltage
Pulse for focus search transmitted from IC401

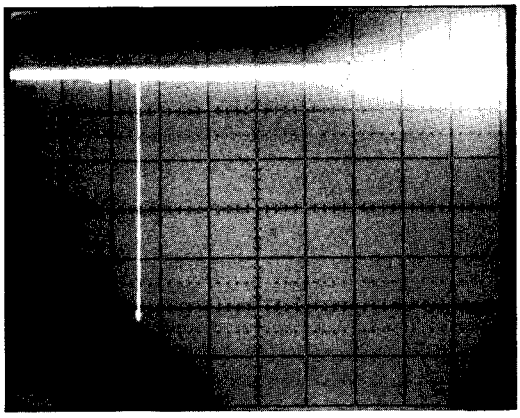
IC401 Pin ⑫ FCS signal



0.5 s/div 1 V/div

6. Focus zero-cross output
Pulse showing that focus output waveform has almost passed the zero point.

IC502 Pin ① output

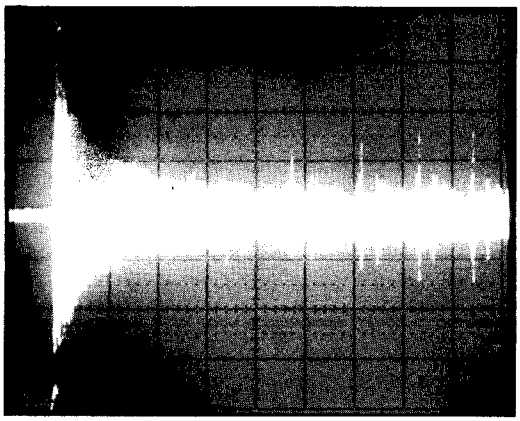


2 ms/div 1 V/div

7. Focus drive waveform

Waveform until focus is obtained, spindle motor starts to rotate and TOC is read.

Q554 emitter; when focus has been finished and motor starts to rotate

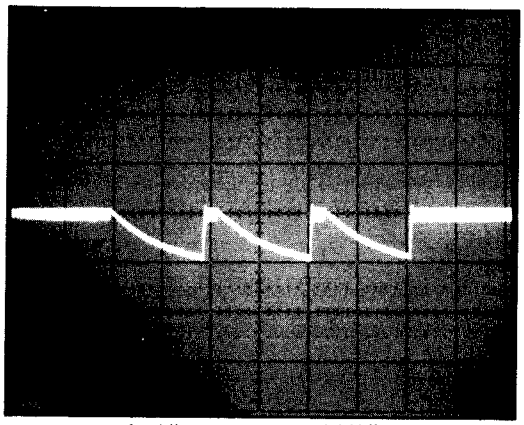


0.2 s/div 0.5 V/div

8. Drive waveform during focus search

Drive waveform of focus coil when the platter is loaded without a disc.

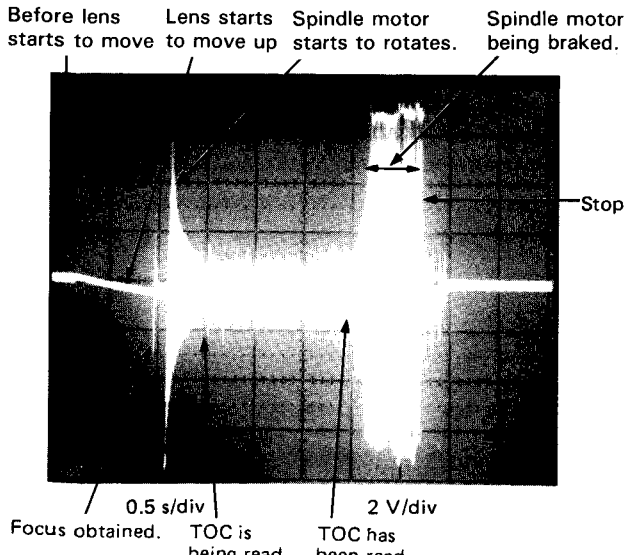
Q544 emitter; focus signal when no disc is loaded



1 s/div 1 V/div

9.Waveform until TOC is read

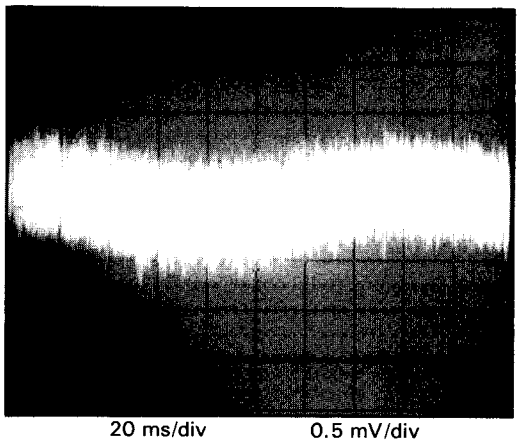
Q554 emitter; until TOC has been read and spindle motor stops



10. Tracking waveform during normal play

Q501 emitter

Wavevform during play

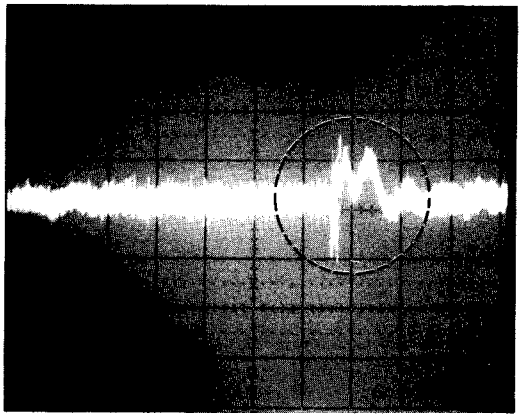


20 ms/div 0.5 mV/div

11. TP2 (TE) waveform of high speed search in forward direction

Output when track is jumped is visible

TP2 (TE); in case of transporting in high speed search ▶▶

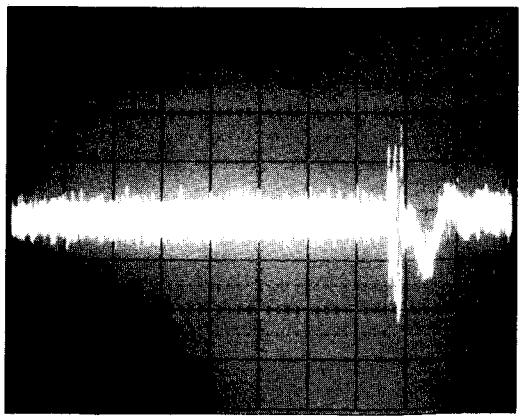


2 ms/div 0.5 V/div

12. TP2 (TE) waveform of high speed search in backward direction

The waveform the reverse of that in high speed search in forward direction is shown.

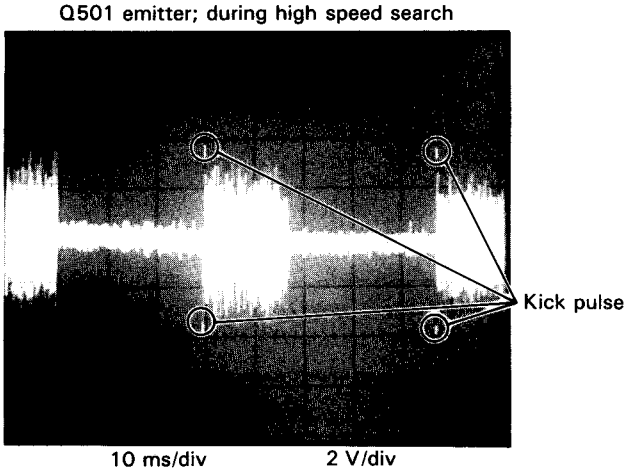
TP2 (TE); in case of returning by high speed search ◀◀



2 ms/div 0.5 V/div

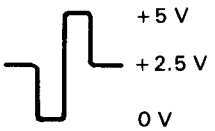
13. Drive waveform during high speed search
Output such as noise is output when track is crossed.

Q501 emitter; during high speed search

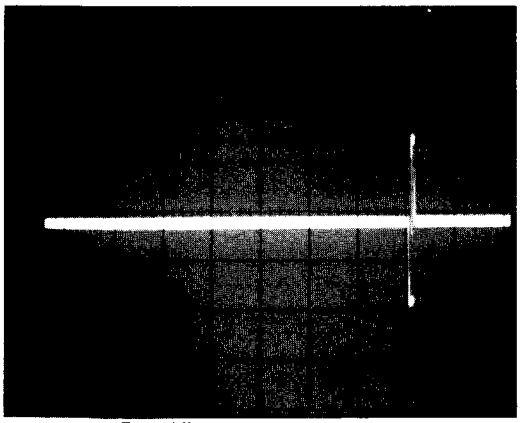


10 ms/div 2 V/div

14. Kick pulse when searching
When advancing the track, waveform below is output.



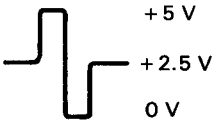
Q501 emitter; Kick pulse when ▶▶ is used.



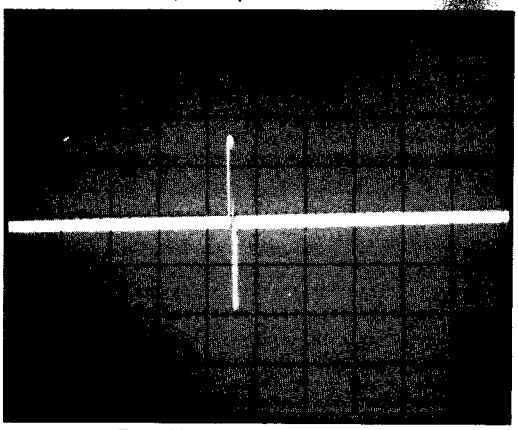
5 ms/div 0.5 V/div

Note: Insert the LPF shown below between the test point and the mesuring equipment.

15. Kick pulse when searching
When returning the track, waveform below is output.

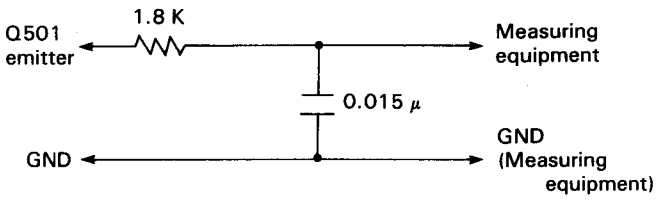


Q501 emitter; Kick pulse when ◀◀ is used.



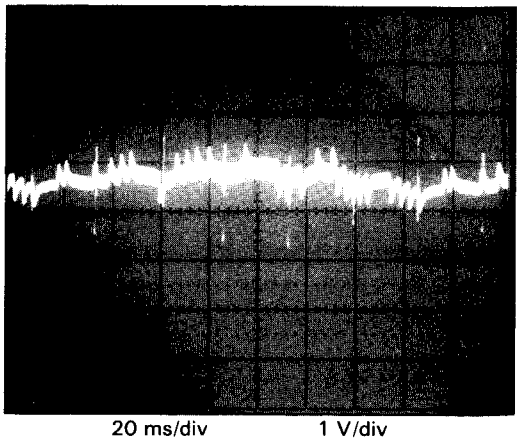
5 ms/div 0.5 V/div

LPF circuit



16. Spindle motor drive waveform during play

IC801 Pin ⑧

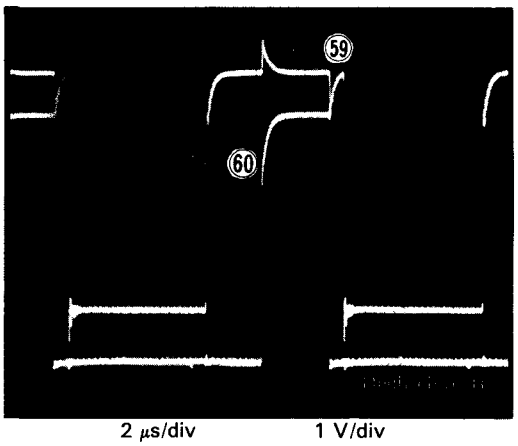


20 ms/div 1 V/div

17. L/R switching signal and deglitch signal of R

R deglitch signal (Pin (60)) is input when switching signal (Pin (59)) is at "H" level.

Waveforms of IC302 Pins (59) and (60)

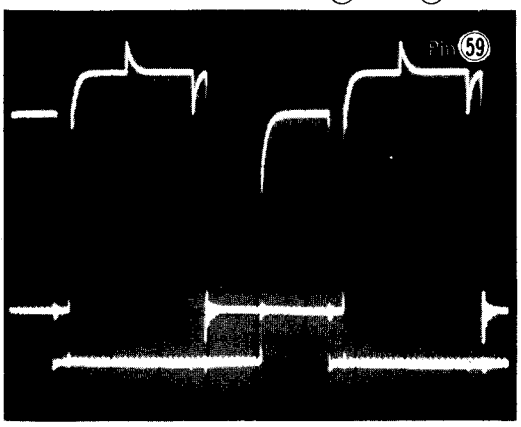


2 μs/div 1 V/div

18. L/R switching signal and deglitch signal of L

L deglitch signal (Pin (61)) is input when switching signal (Pin (59)) is at "L" level.

Waveform of IC302 Pins (59) and (61)



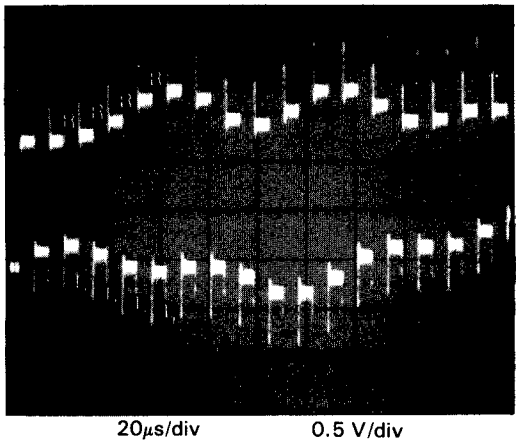
2 μs/div 1 V/div

Note: Photos (17) and (18) are shifted by 1 V for better visibility.

19. AF signal switched after D/A

Waveform showing that R and L are output alternately.

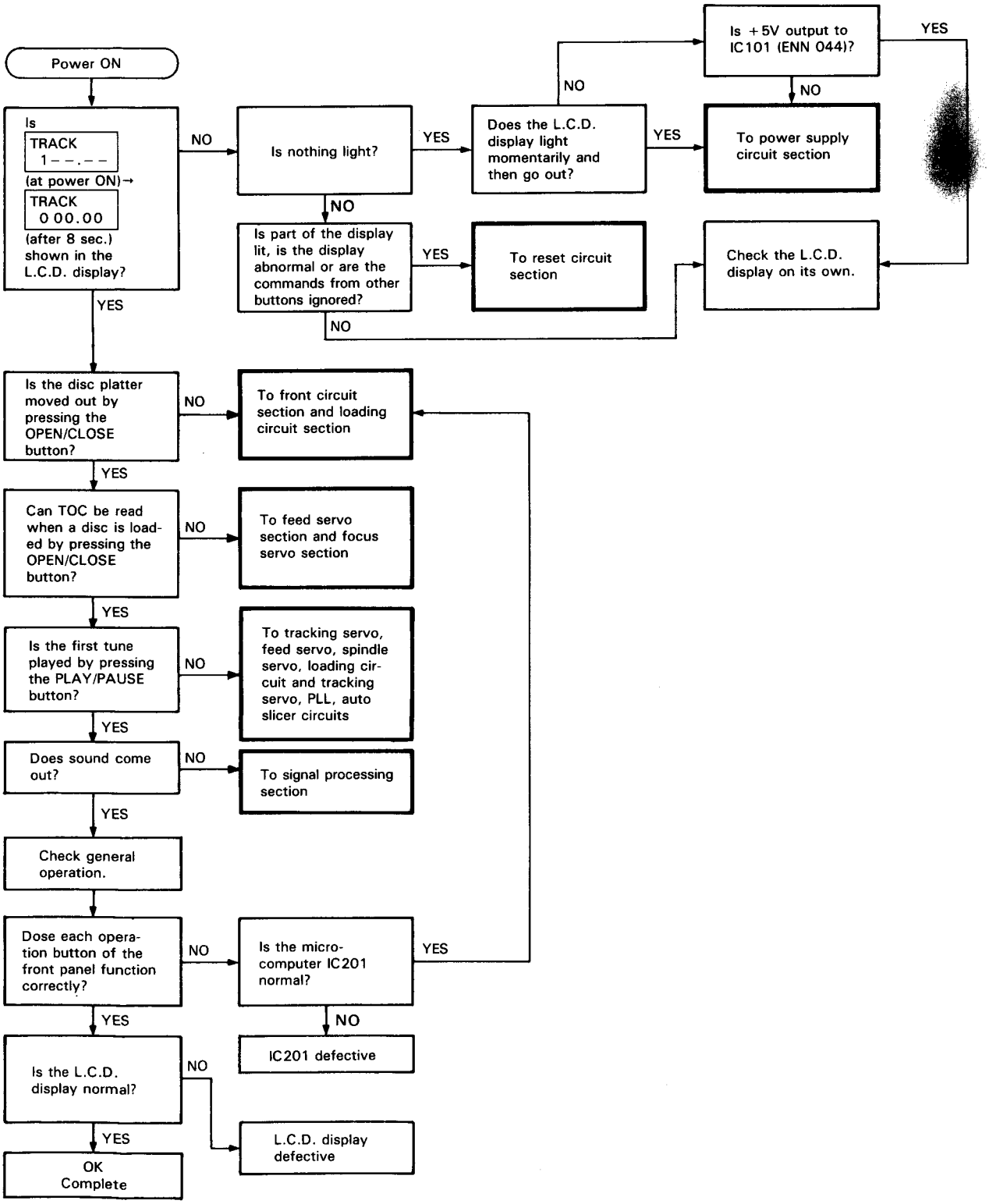
R/L signal switched of IC303 Pins (19) and (20)



20μs/div 0.5 V/div

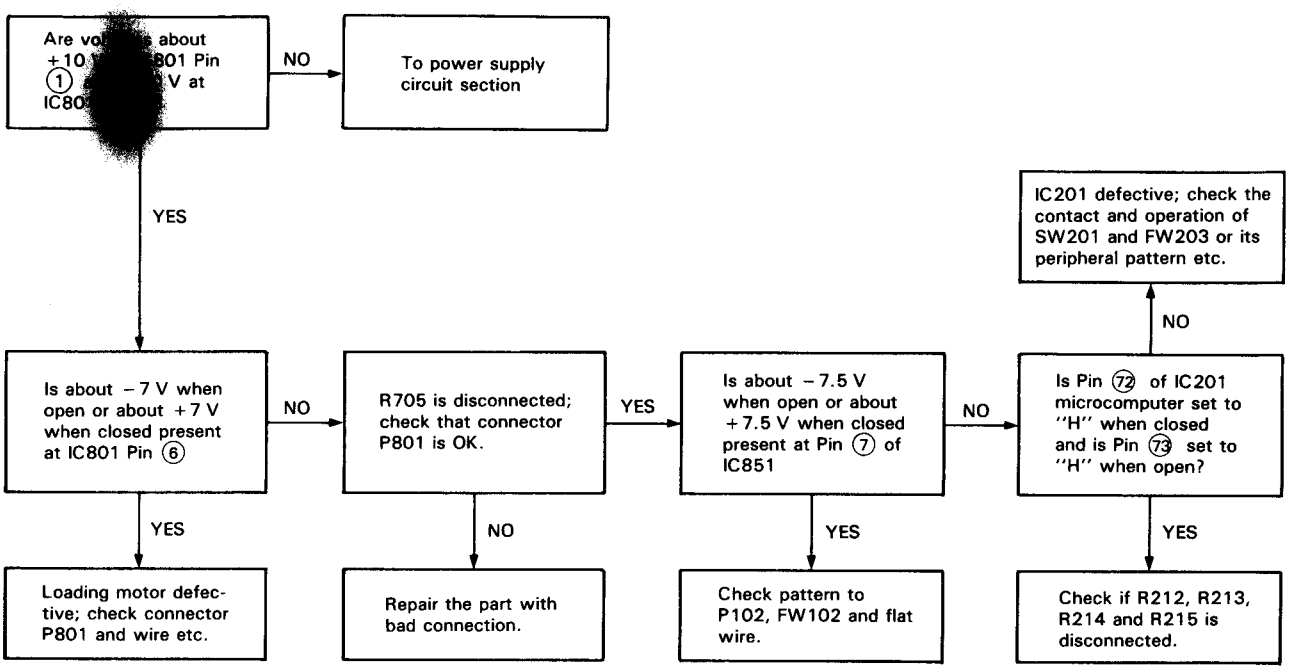
Troubleshooting

Shows the condition of each circuit from when the power is switched on to when play can be started.

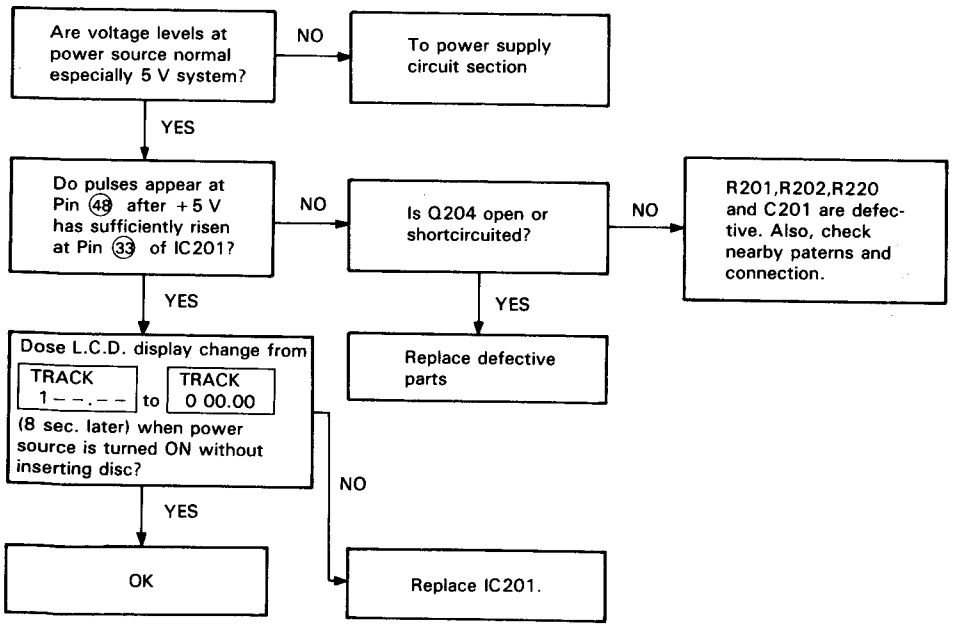

Power ON
Is TRACK 1--.-- (at power ON)→ TRACK 0 00.00 (after 8 sec.) shown in the L.C.D. display?
NO
Is nothing light?
YES
Does the L.C.D. display light momentarily and then go out?
YES
Is +5V output to IC101 (ENN 044)?
YES
NO
To power supply circuit section
NO
Is part of the display lit, is the display abnormal or are the commands from other buttons ignored?
YES
To reset circuit section
Check the L.C.D. display on its own.
NO
YES
Is the disc platter moved out by pressing the OPEN/CLOSE button?
NO
To front circuit section and loading circuit section
YES
Can TOC be read when a disc is loaded by pressing the OPEN/CLOSE button?
NO
To feed servo section and focus servo section
YES
Is the first tune played by pressing the PLAY/PAUSE button?
NO
To tracking servo, feed servo, spindle servo, loading circuit and tracking servo, PLL, auto slicer circuits
YES
Does sound come out?
NO
To signal processing section
YES
Check general operation.
Dose each operation button of the front panel function correctly?
NO
Is the micro-computer IC201 normal?
YES
NO
IC201 defective
YES
Is the L.C.D. display normal?
NO
L.C.D. display defective
YES
OK
Complete

Loading Circuit

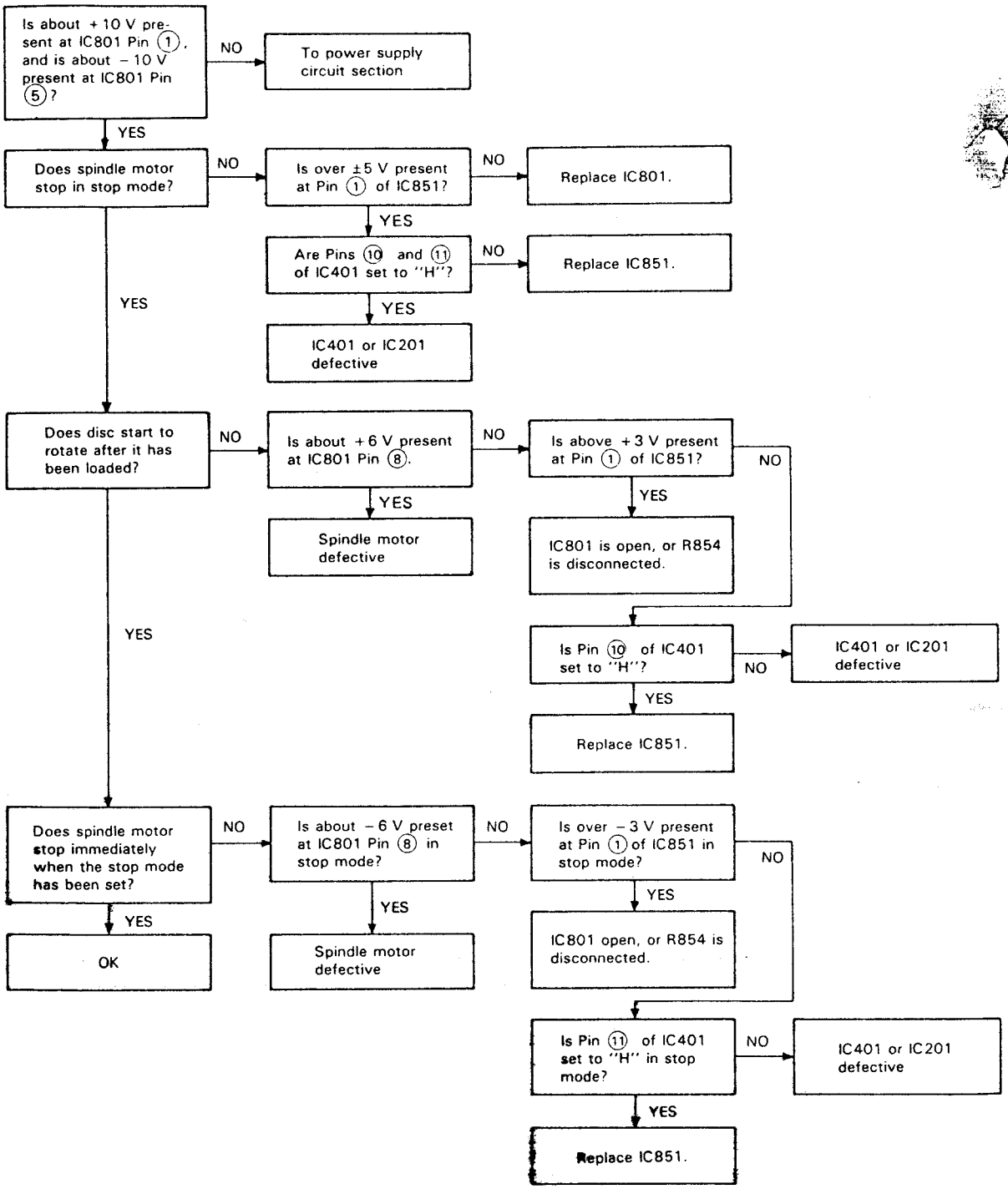
(Perform these steps when the drawer does not move even when the OPEN/CLOSE button on the front panel is pressed.)


Are vo about +10 801 Pin ① V at IC80
NO
To power supply circuit section
YES
IC201 defective; check the contact and operation of SW201 and FW203 or its peripheral pattern etc.
NO
Is about −7 V when open or about +7 V when closed present at IC801 Pin ⑥
NO
R705 is disconnected; check that connector P801 is OK.
YES
Is about −7.5 V when open or about +7.5 V when closed present at Pin ⑦ of IC851
NO
Is Pin ⑫ of IC201 microcomputer set to "H" when closed and is Pin ⑬ set to "H" when open?
YES
NO
YES
YES
Loading motor defective; check connector P801 and wire etc.
Repair the part with bad connection.
Check pattern to P102, FW102 and flat wire.
Check if R212, R213, R214 and R215 is disconnected.

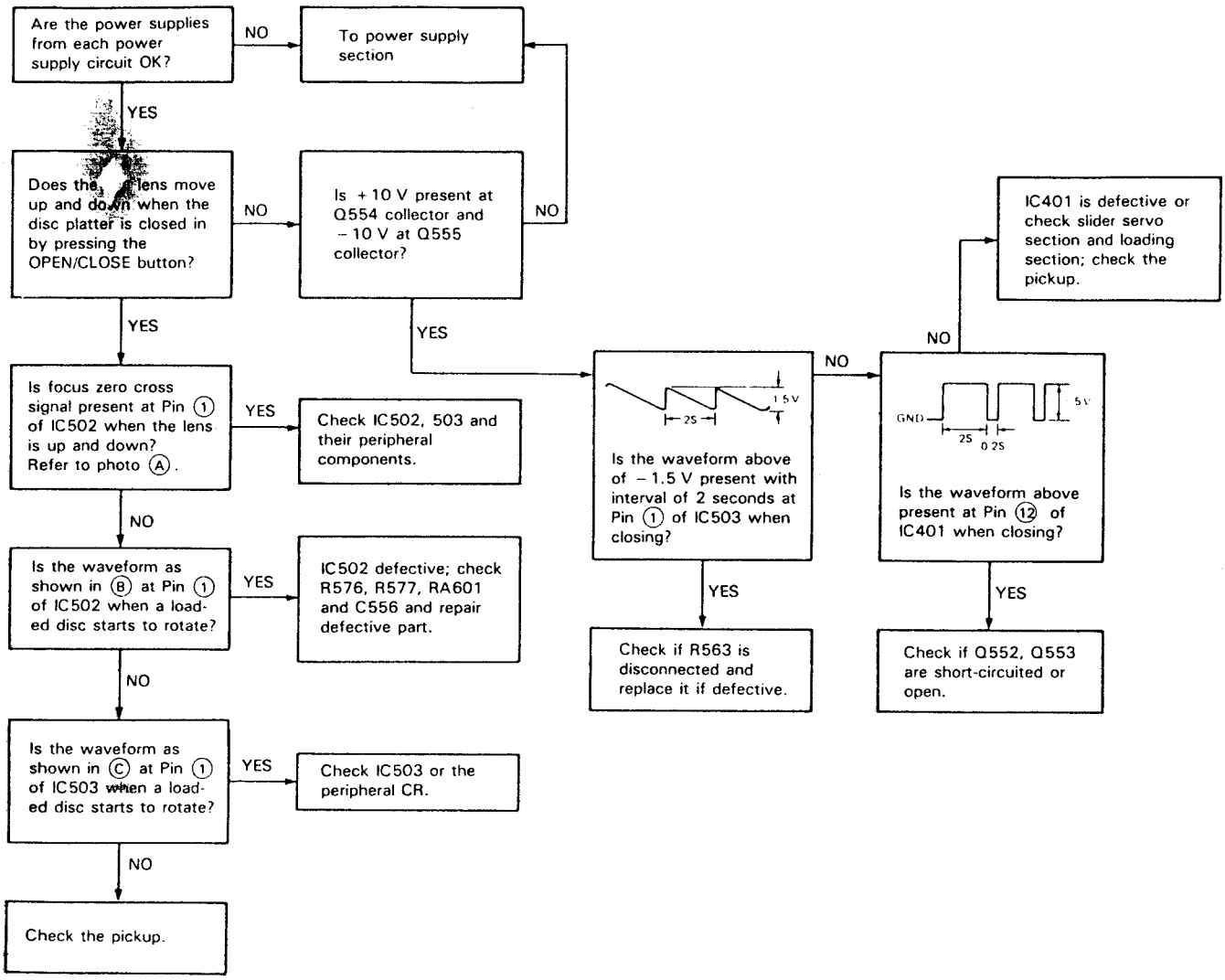
Reset Circuit Section


Are voltage levels at power source normal especially 5 V system?
NO
To power supply circuit section
YES
Do pulses appear at Pin ㊽ after +5 V has sufficiently risen at Pin ㉝ of IC201?
NO
Is Q204 open or shortcircuited?
NO
R201,R202,R220 and C201 are defective. Also, check nearby paterns and connection.
YES
YES
Dose L.C.D. display change from TRACK 1−−.−− to TRACK 0 00.00 (8 sec. later) when power source is turned ON without inserting disc?
Replace defective parts
NO
YES
OK
Replace IC201.

Spindle Servo Section

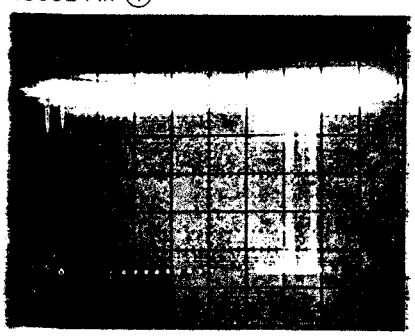

Is about +10 V present at IC801 Pin (1), and is about −10 V present at IC801 Pin (5)?
NO
To power supply circuit section
YES
Does spindle motor stop in stop mode?
NO
Is over ±5 V present at Pin (1) of IC851?
NO
Replace IC801.
YES
Are Pins (10) and (11) of IC401 set to "H"?
NO
Replace IC851.
YES
IC401 or IC201 defective
YES
Does disc start to rotate after it has been loaded?
NO
Is about +6 V present at IC801 Pin (8).
NO
Is above +3 V present at Pin (1) of IC851?
NO
YES
Spindle motor defective
YES
IC801 is open, or R854 is disconnected.
YES
Is Pin (10) of IC401 set to "H"?
NO
IC401 or IC201 defective
YES
Replace IC851.
Does spindle motor stop immediately when the stop mode has been set?
NO
Is about −6 V preset at IC801 Pin (8) in stop mode?
NO
Is over −3 V present at Pin (1) of IC851 in stop mode?
NO
YES
YES
YES
OK
Spindle motor defective
IC801 open, or R854 is disconnected.
Is Pin (11) of IC401 set to "H" in stop mode?
NO
IC401 or IC201 defective
YES
Replace IC851.

Focus Servo Section


Are the power supplies from each power supply circuit OK?
NO
To power supply section
YES
Does the lens move up and down when the disc platter is closed in by pressing the OPEN/CLOSE button?
NO
Is +10 V present at Q554 collector and −10 V at Q555 collector?
NO
YES
YES
Is focus zero cross signal present at Pin ① of IC502 when the lens is up and down? Refer to photo Ⓐ.
YES
Check IC502, 503 and their peripheral components.
NO
Is the waveform as shown in Ⓑ at Pin ① of IC502 when a loaded disc starts to rotate?
YES
IC502 defective; check R576, R577, RA601 and C556 and repair defective part.
NO
Is the waveform as shown in Ⓒ at Pin ① of IC503 when a loaded disc starts to rotate?
YES
Check IC503 or the peripheral CR.
NO
Check the pickup.
1.5V
2S
Is the waveform above of −1.5 V present with interval of 2 seconds at Pin ① of IC503 when closing?
NO
YES
Check if R563 is disconnected and replace it if defective.
IC401 is defective or check slider servo section and loading section; check the pickup.
NO
GND
5V
2S
0.2S
Is the waveform above present at Pin ⑫ of IC401 when closing?
YES
Check if Q552, Q553 are short-circuited or open.

Ⓐ **Output waveform of focus zero-cross**
Minus pulse is generated when focus signal passes near zero.

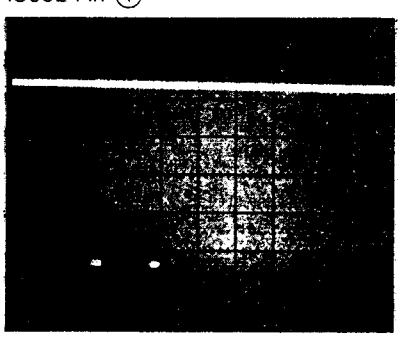
IC502 Pin ①



0.2 s/div 5 V/div

Ⓑ **Waveform when focus zero-cross is started to play**
Focus zero-cross signal just before play stats; pulse width is about 10 ms.

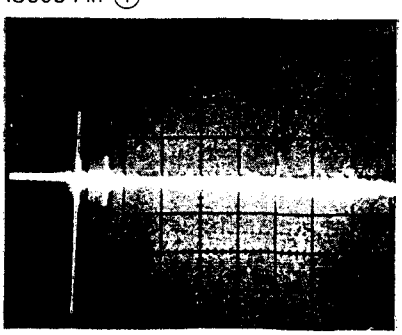
IC502 Pin ①



50 ms/div 5 V/div

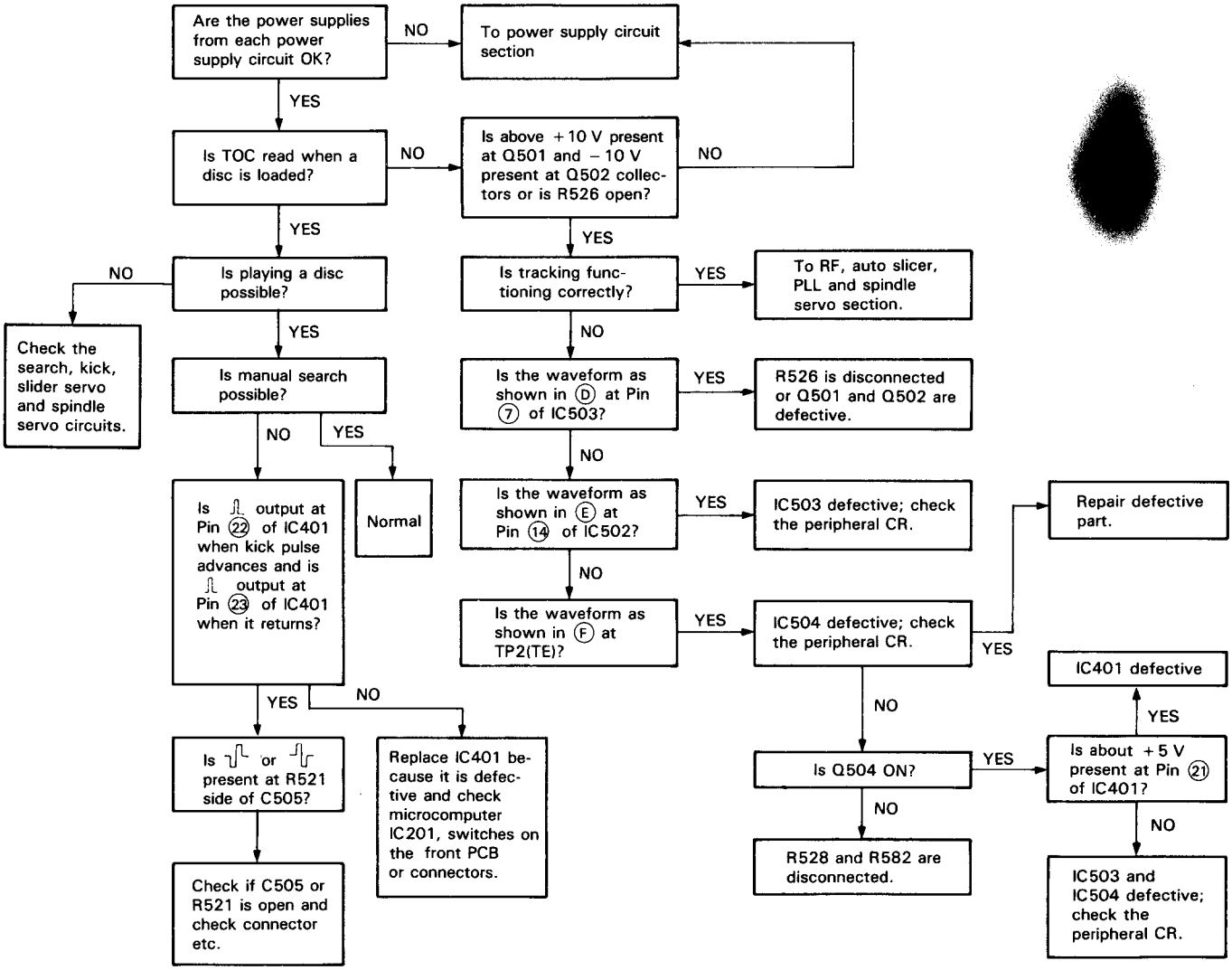
Ⓒ **Focus signal when a loaded disc starts to be played**
Strong signal is output when focus starts to be obtained but it becomes of small amplitude when it enters in servo loop.

IC503 Pin ①



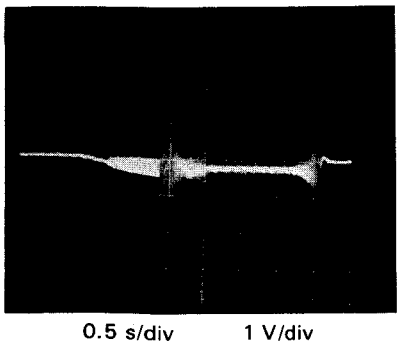
0.1 s/div 0.5 V/div

Tracking Servo Section


Are the power supplies from each power supply circuit OK?
NO
To power supply circuit section
YES
Is TOC read when a disc is loaded?
NO
Is above +10 V present at Q501 and −10 V present at Q502 collectors or is R526 open?
NO
YES
YES
Is playing a disc possible?
NO
Check the search, kick, slider servo and spindle servo circuits.
YES
Is tracking functioning correctly?
YES
To RF, auto slicer, PLL and spindle servo section.
Is manual search possible?
NO
YES
NO
Is the waveform as shown in Ⓓ at Pin ⑦ of IC503?
YES
R526 is disconnected or Q501 and Q502 are defective.
NO
Normal
Is ⎍ output at Pin ㉒ of IC401 when kick pulse advances and is ⎍ output at Pin ㉓ of IC401 when it returns?
Is the waveform as shown in Ⓔ at Pin ⑭ of IC502?
YES
IC503 defective; check the peripheral CR.
Repair defective part.
NO
Is the waveform as shown in Ⓕ at TP2(TE)?
YES
IC504 defective; check the peripheral CR.
YES
IC401 defective
YES
NO
NO
Is ⎍ or ⎍ present at R521 side of C505?
Replace IC401 because it is defective and check microcomputer IC201, switches on the front PCB or connectors.
Is Q504 ON?
YES
Is about +5 V present at Pin ㉑ of IC401?
NO
NO
R528 and R582 are disconnected.
Check if C505 or R521 is open and check connector etc.
IC503 and IC504 defective; check the peripheral CR.

Ⓓ Waveform when a disc is loaded
Shows until brake is operated after TOC has been read.

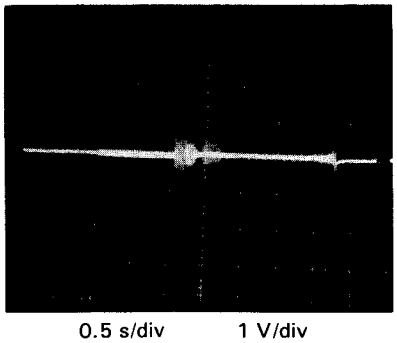
IC503 Pin ⑦



0.5 s/div 1 V/div

Ⓔ Waveform when a disc is loaded
Shows until brake is operated after TOC has been read.

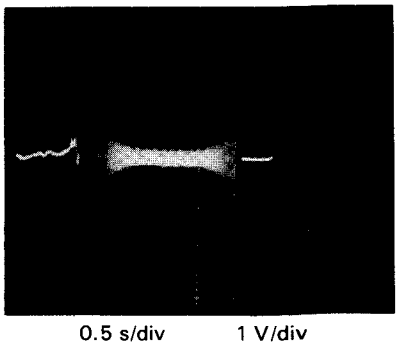
IC502 Pin ⑭



0.5 s/div 1 V/div

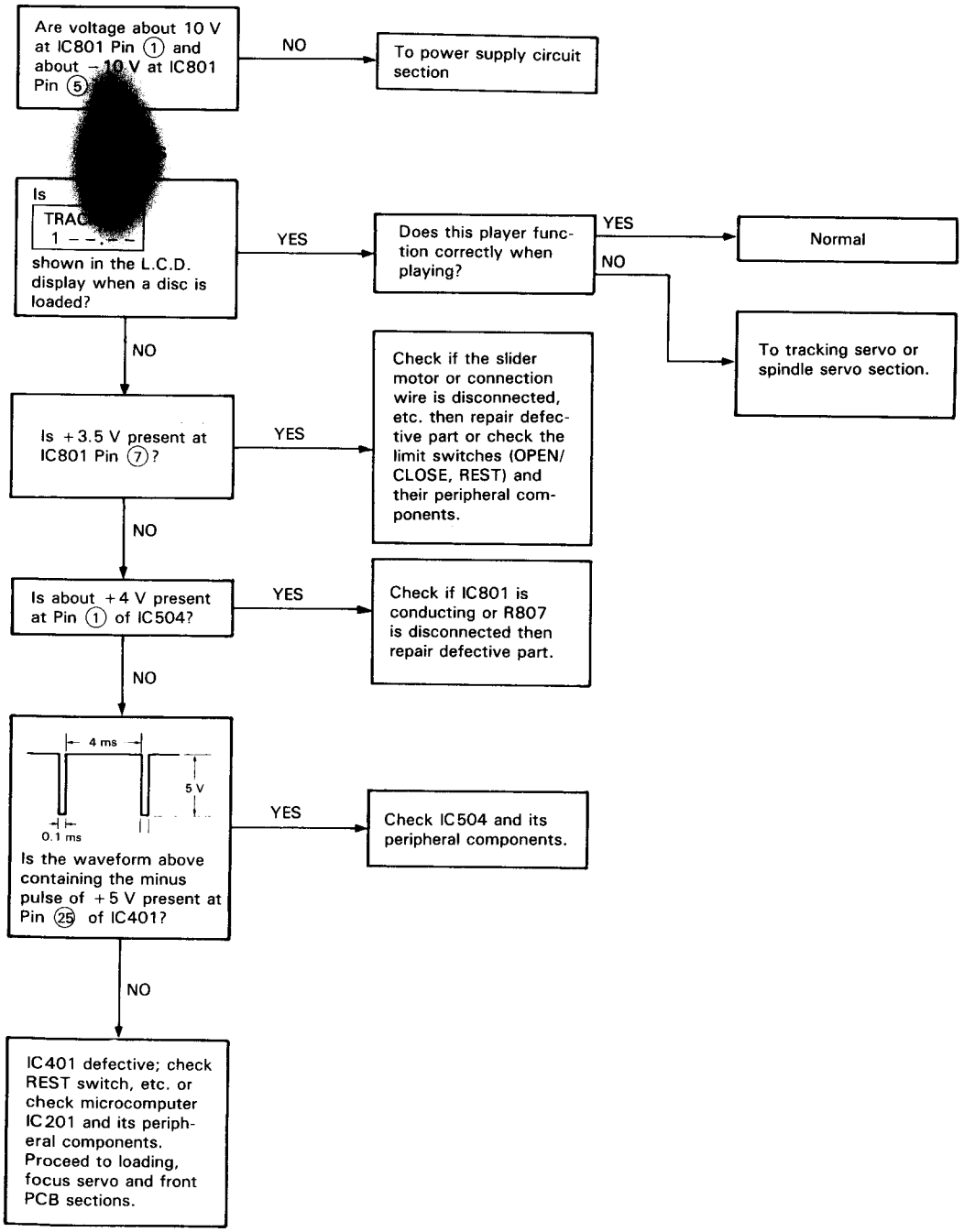
Ⓕ Waveform when a disc is loaded
Shows until brake is operated after TOC has been read.

TP2 (TE)

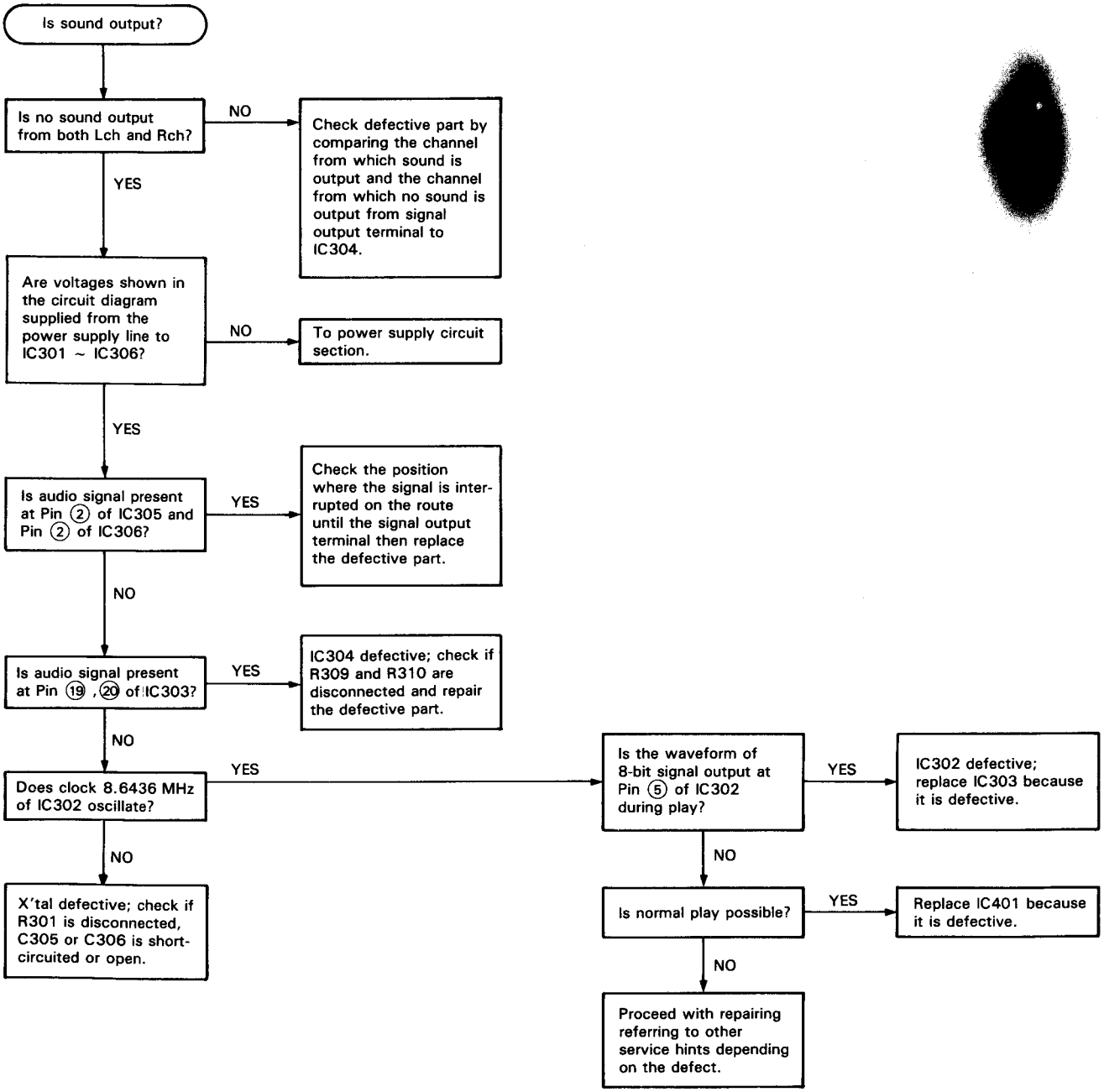


0.5 s/div 1 V/div

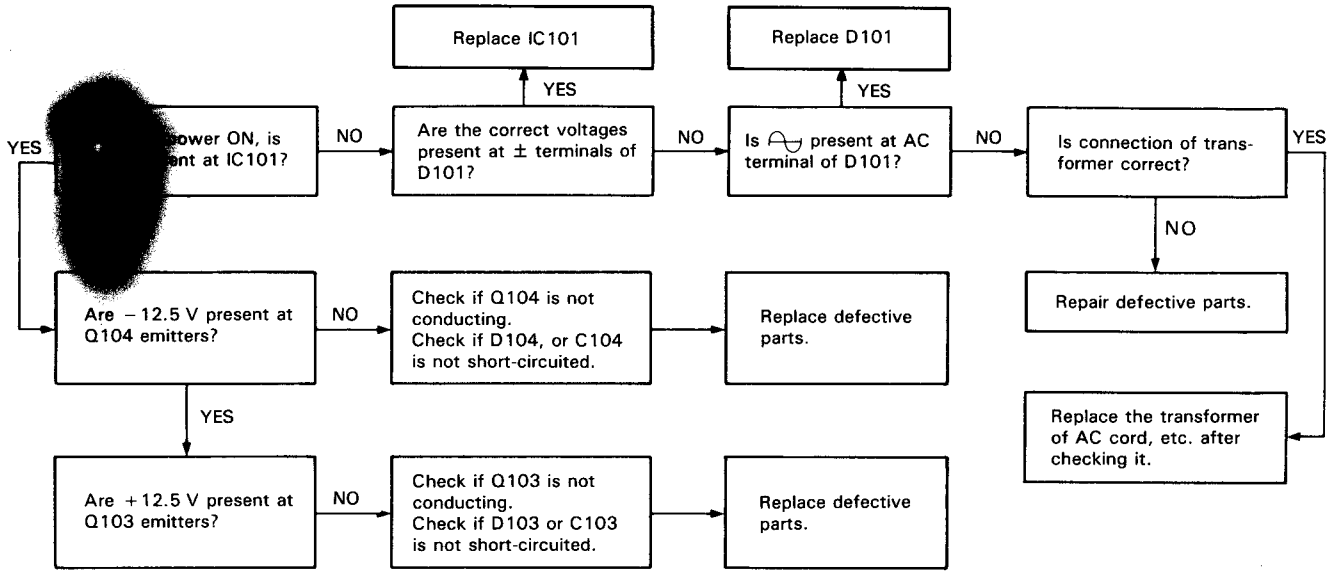
Feed Servo Section


Are voltage about 10 V at IC801 Pin ① and about −10 V at IC801 Pin ⑤
NO
To power supply circuit section
Is TRAC 1 shown in the L.C.D. display when a disc is loaded?
YES
Does this player function correctly when playing?
YES
Normal
NO
To tracking servo or spindle servo section.
NO
Is +3.5 V present at IC801 Pin ⑦?
YES
Check if the slider motor or connection wire is disconnected, etc. then repair defective part or check the limit switches (OPEN/CLOSE, REST) and their peripheral components.
NO
Is about +4 V present at Pin ① of IC504?
YES
Check if IC801 is conducting or R807 is disconnected then repair defective part.
NO
4 ms
5 V
0.1 ms
Is the waveform above containing the minus pulse of +5 V present at Pin ㉕ of IC401?
YES
Check IC504 and its peripheral components.
NO
IC401 defective; check REST switch, etc. or check microcomputer IC201 and its peripheral components. Proceed to loading, focus servo and front PCB sections.

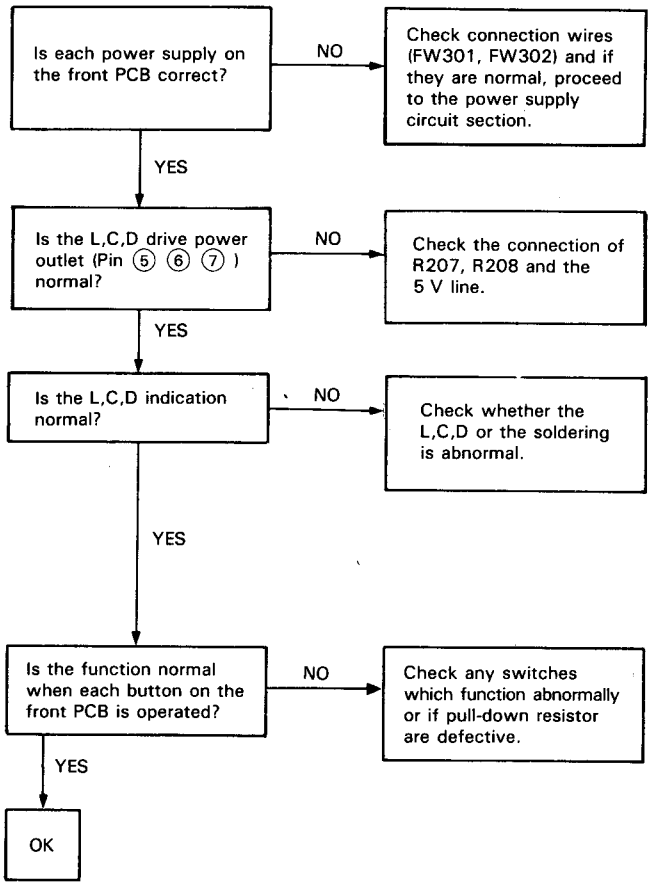
Signal Processing Section


Is sound output?
Is no sound output from both Lch and Rch?
NO
Check defective part by comparing the channel from which sound is output and the channel from which no sound is output from signal output terminal to IC304.
YES
Are voltages shown in the circuit diagram supplied from the power supply line to IC301 ~ IC306?
NO
To power supply circuit section.
YES
Is audio signal present at Pin ② of IC305 and Pin ② of IC306?
YES
Check the position where the signal is interrupted on the route until the signal output terminal then replace the defective part.
NO
Is audio signal present at Pin ⑲ , ⑳ of IC303?
YES
IC304 defective; check if R309 and R310 are disconnected and repair the defective part.
NO
Does clock 8.6436 MHz of IC302 oscillate?
YES
Is the waveform of 8-bit signal output at Pin ⑤ of IC302 during play?
YES
IC302 defective; replace IC303 because it is defective.
NO
X'tal defective; check if R301 is disconnected, C305 or C306 is short-circuited or open.
NO
Is normal play possible?
YES
Replace IC401 because it is defective.
NO
Proceed with repairing referring to other service hints depending on the defect.

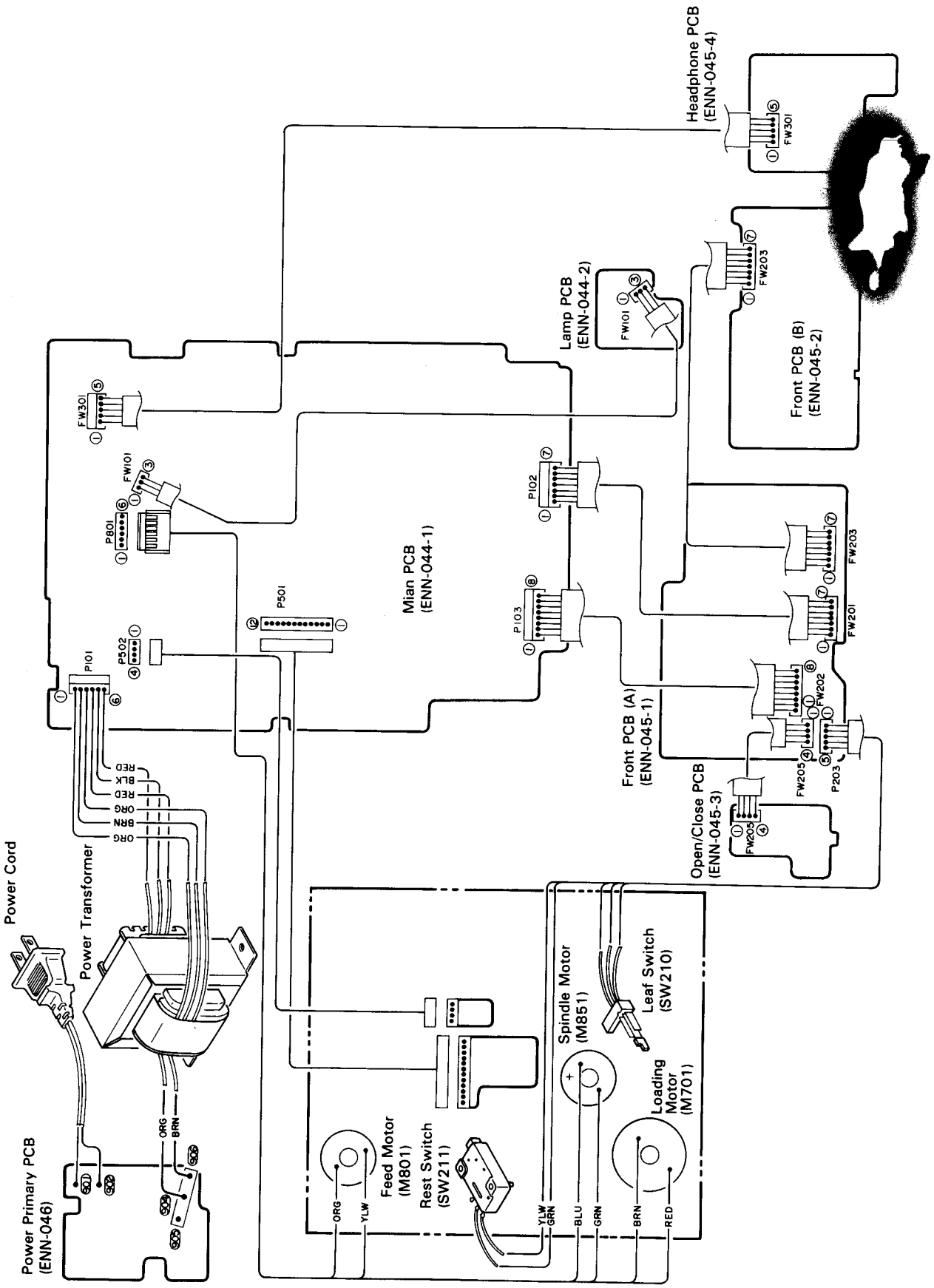
Power Supply Circuit Section



Front PCB Section

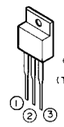

Is each power supply on the front PCB correct?
NO
Check connection wires (FW301, FW302) and if they are normal, proceed to the power supply circuit section.
YES
Is the L,C,D drive power outlet (Pin ⑤ ⑥ ⑦) normal?
NO
Check the connection of R207, R208 and the 5 V line.
YES
Is the L,C,D indication normal?
NO
Check whether the L,C,D or the soldering is abnormal.
YES
Is the function normal when each button on the front PCB is operated?
NO
Check any switches which function abnormally or if pull-down resistor are defective.
YES
OK

Connection Diagram



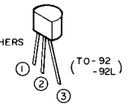
(2) Power Supply Section

TRANSISTOR



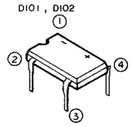
1. BASE
2. COLLECTOR
3. EMITTER

TRANSISTOR



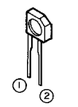
1. EMITTER
2. COLLECTOR
3. BASE

DI01 , DI02



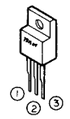
1. OUT -
2. AC
3. AC
4. OUT +

PHOTO DIODE
D201



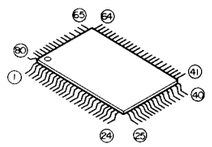
1. CATHODE
2. ANODE

IC101
(78M05)

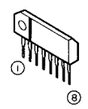


1. IN
2. GND
3. OUT (5V)

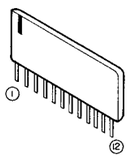
IC201
(μPD7514G-180)



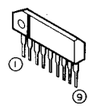
IC203 , IC402
IC503 IC504
IC851 (SIP)



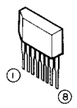
IC305 , IC306



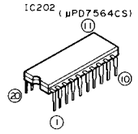
IC501
(SIP)



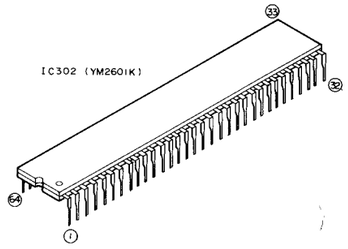
IC801



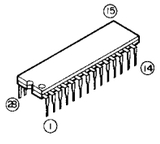
IC202 (μPD7564CS)



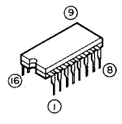
IC302 (YM2601K)



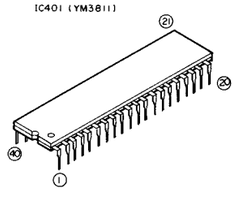
IC303 (PCM54HP)



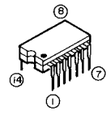
IC304 (BU4053B)



IC401 (YM3811)

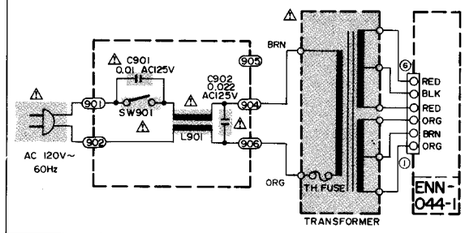


IC502 (DIP)

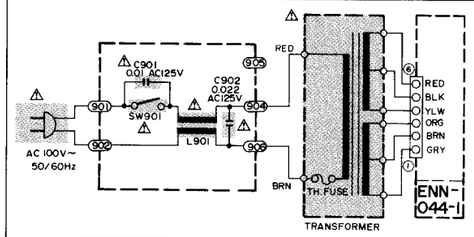


POWER SUPPLY BLOCK

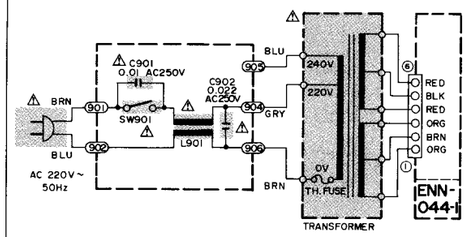
J (for U.S.A.)
C (for Canada)



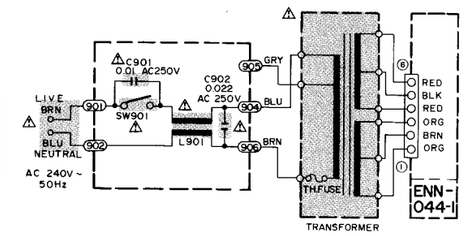
D (for Domestic/Japan)



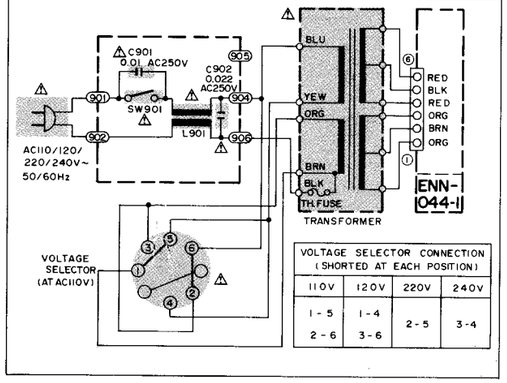
E (for Continental Europe)
G (for West Germany)



A (for Australia)
BS (for U.K.)



P (for U.S. Military Market)
U (for Other Areas)



VOLTAGE SELECTOR CONNECTION
(SHORTED AT EACH POSITION)

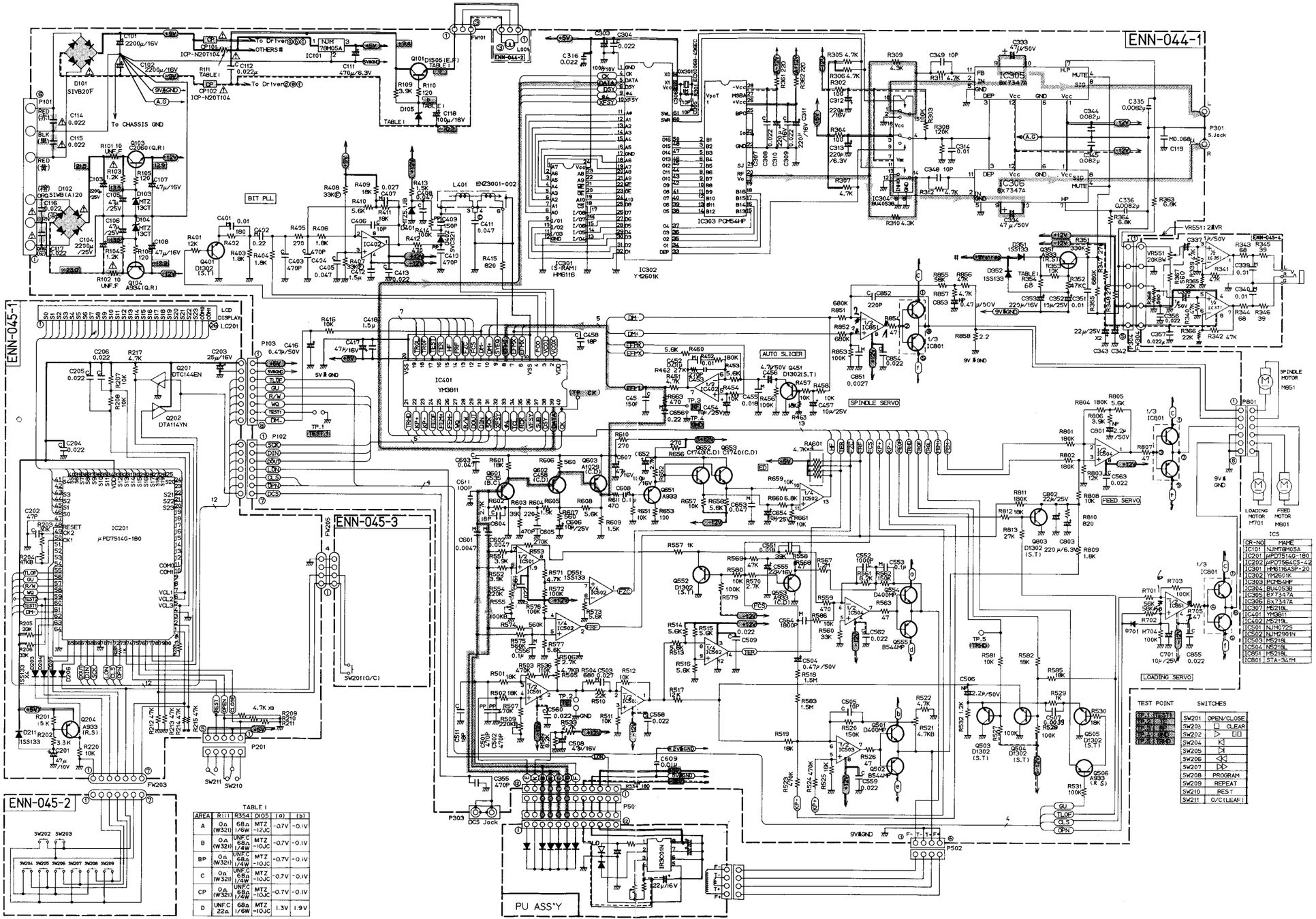
110V	120V	220V	240V
1 - 5 2 - 6	1 - 4 3 - 6	2 - 5	3 - 4

Notes:

1. ▭ shows DC voltage to the chassis with no signal input.
2. —— indicates positive B power supply.
3. ····· indicates negative B power supply.
4. ▭ indicates signal path.
5. When replacing the parts in the darkned are (▭) and those marked with ⚠, be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram.
   The design and contents are subject to change without notice.

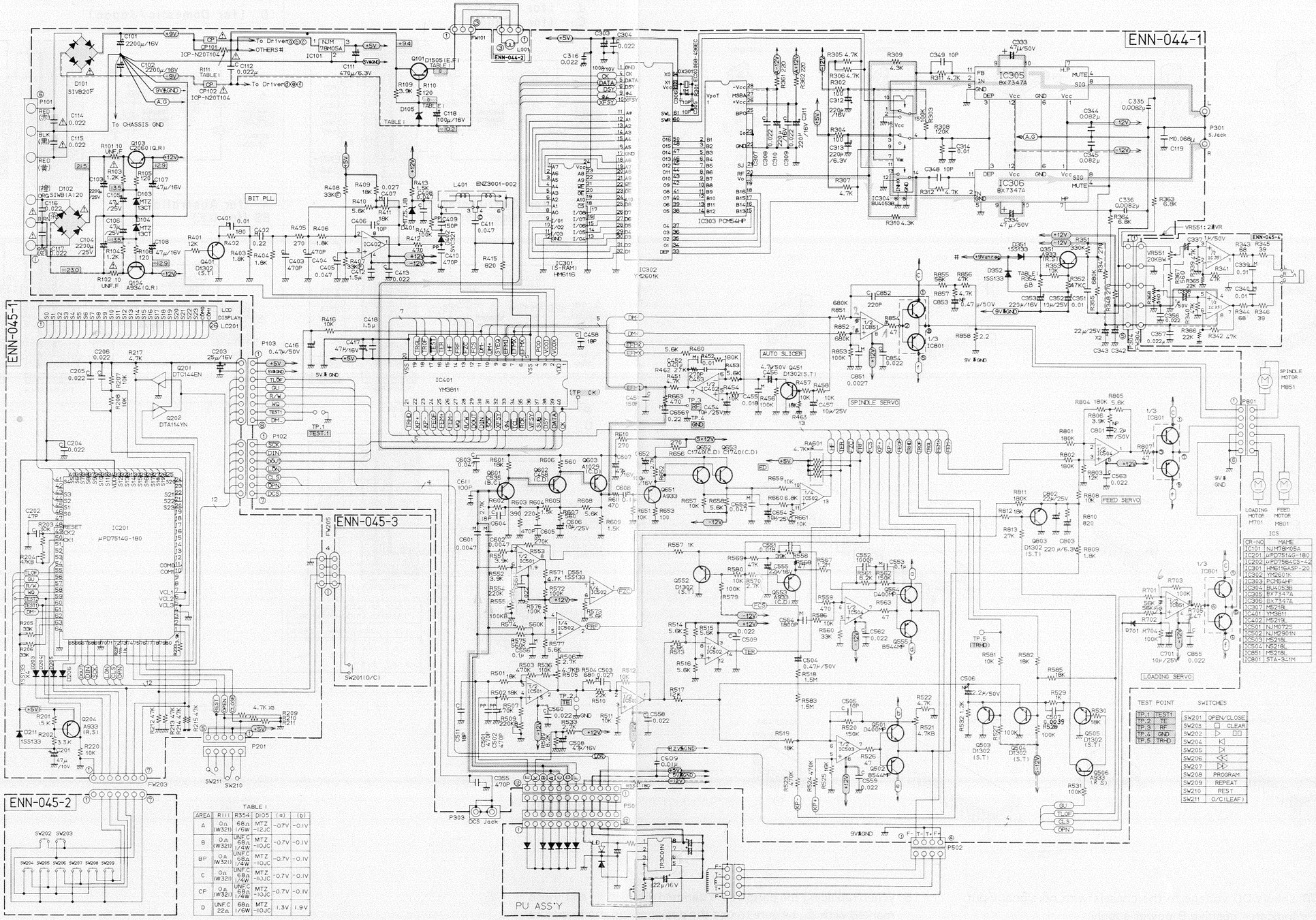
Schematic Diagrams

(1) Main Section



Schematic Diagrams

(1) Main Section



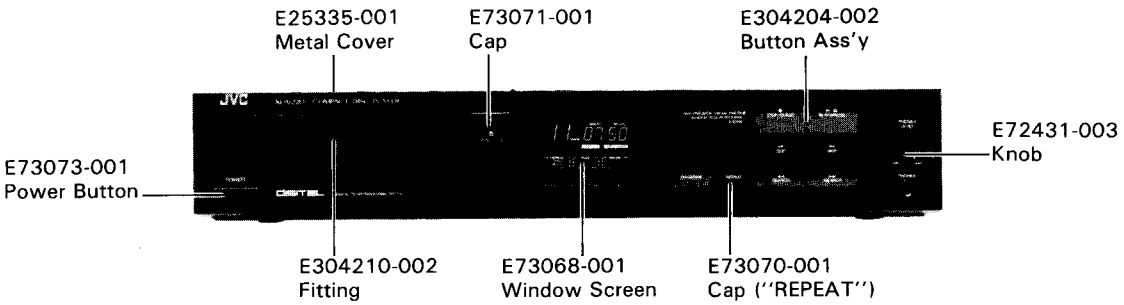
PARTS LIST

Contents

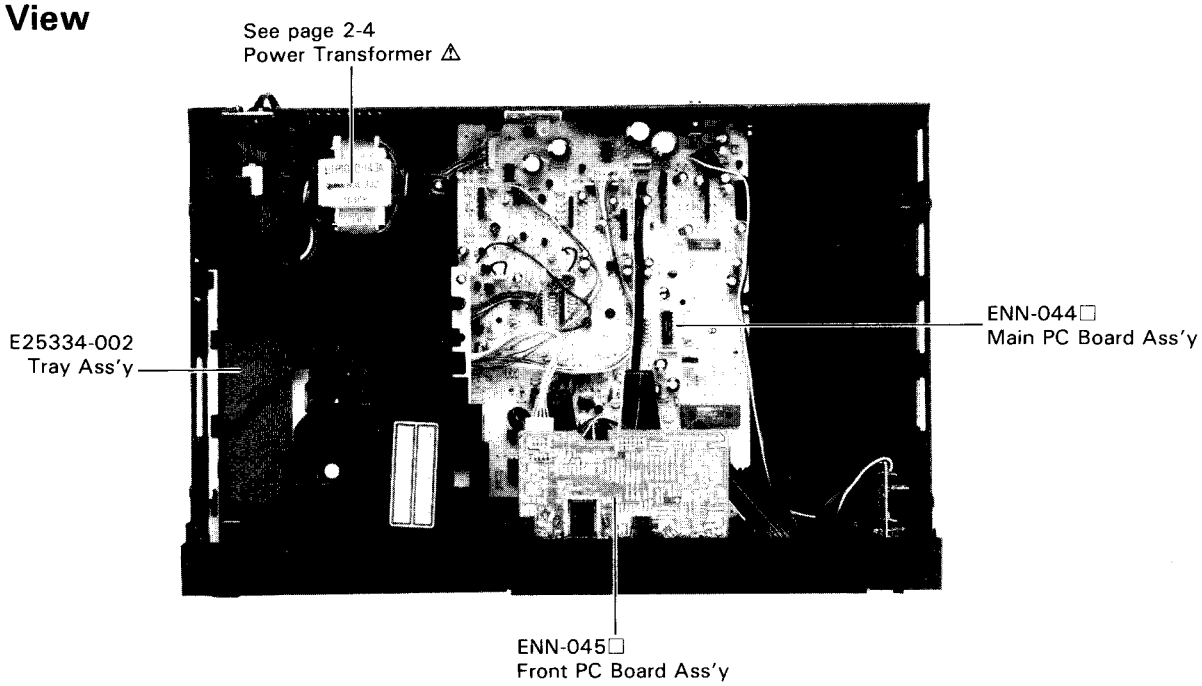
Main Parts Location 2-2
Exploded View and Part List 2-3
Mechanism Ass'y 2-5
Printed Circuit Board Ass'y and Parts List 2-7
■ ENN-044[ ] Main PC Board Ass'y 2-7
■ ENN-045[B] Front PC Board Ass'y 2-11
■ ENN-046[ ] Primary PC Board Ass'y 2-13
Packing Materials and Part Numbers 2-14
Accessories List 2-15

1. Main Parts Location

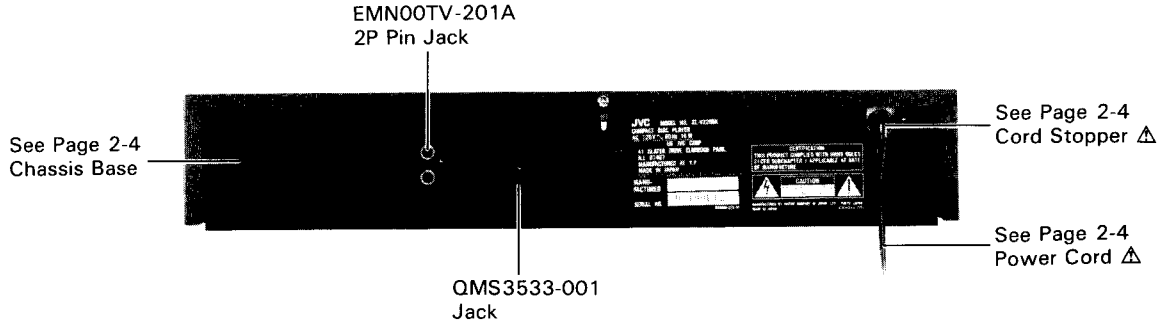
■ Front View



■ Top View

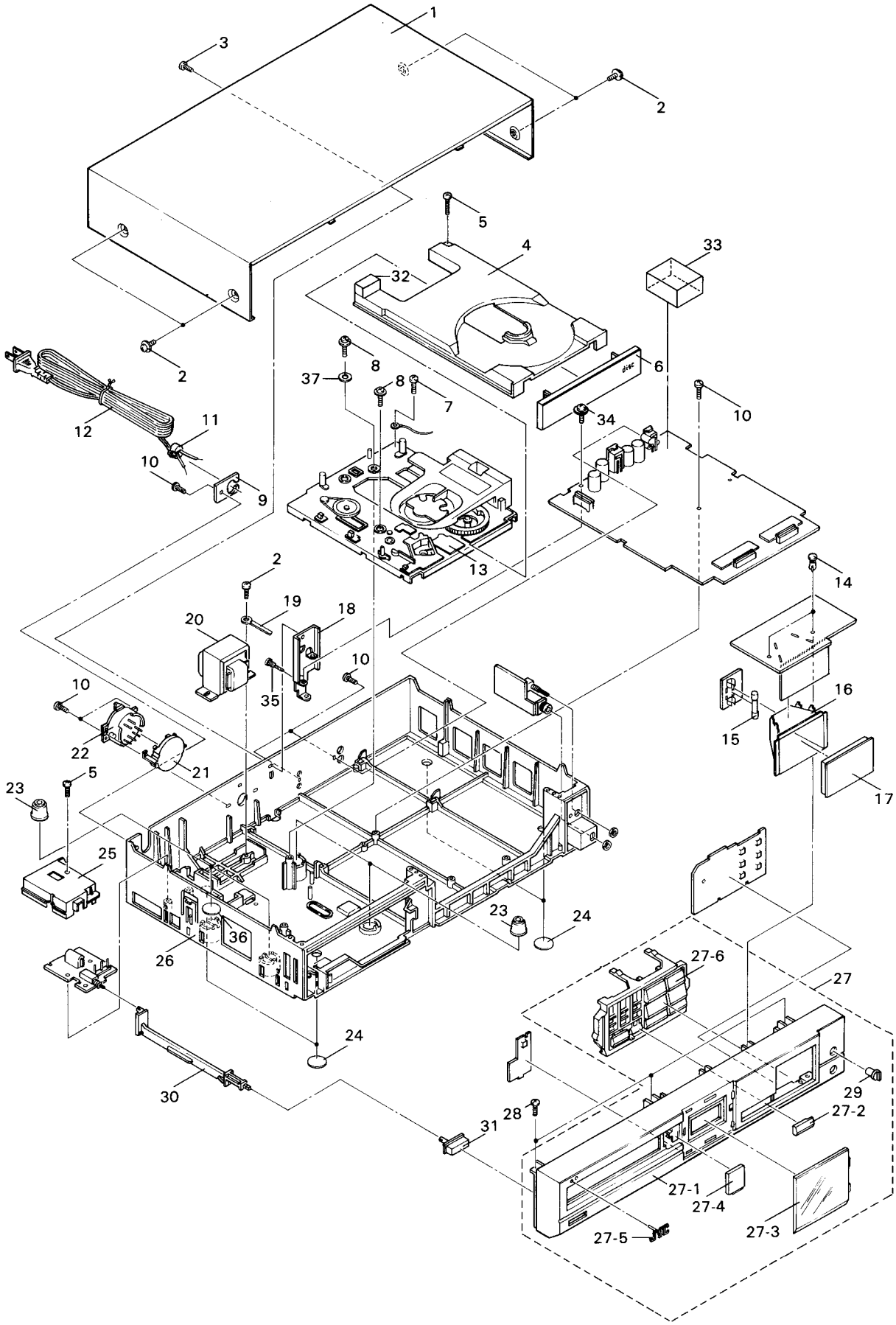


■ Rear View



⚠ : Safety Parts

Exploded View and Part List



Exploded View and Parts List

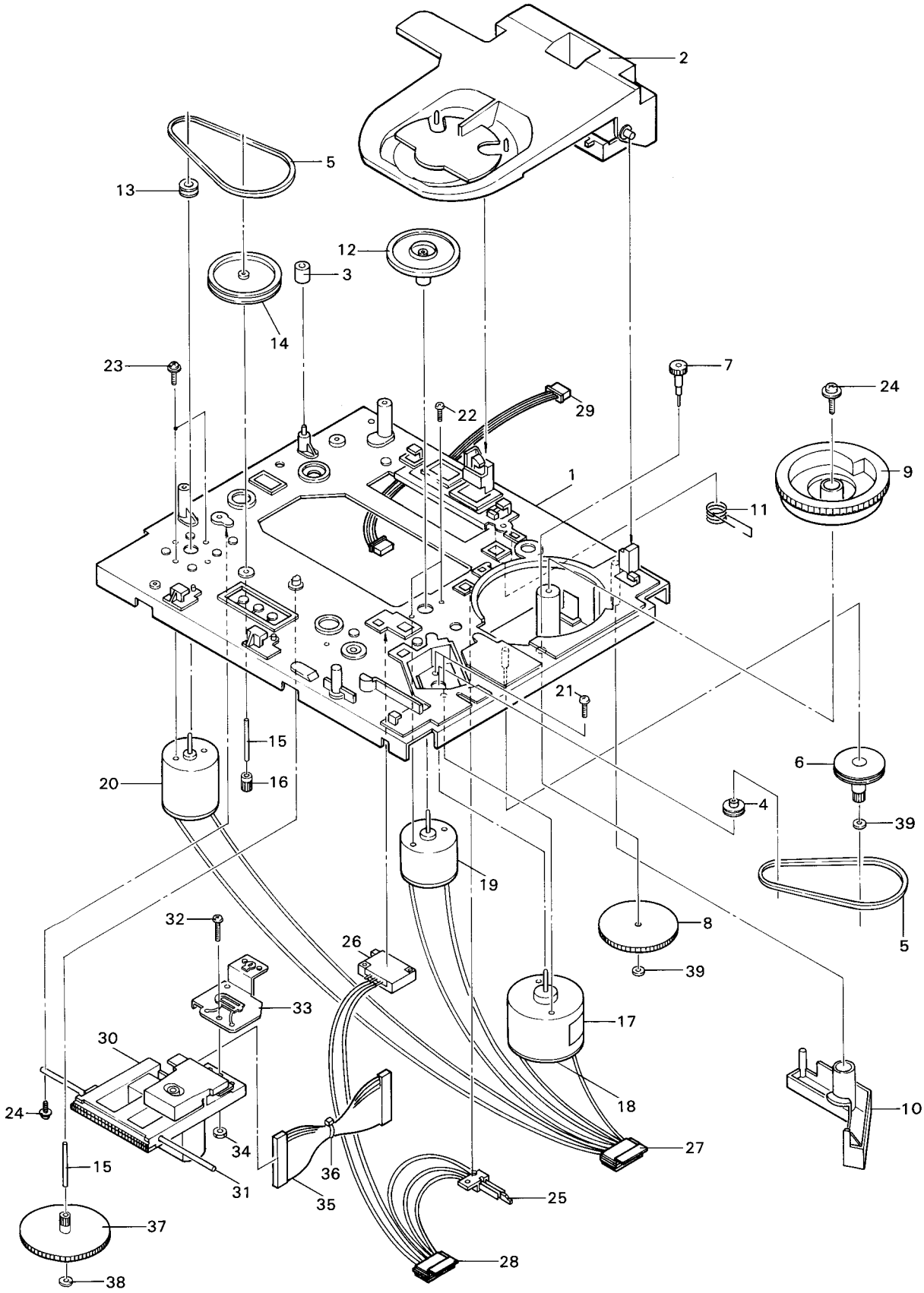
⚠	Item No.	Parts Number	Parts Name	Q'ty	Description	Areas
	1	E25335-001	Metal Cover	1		
	2	E73078-001	Screw	5		
	3	SHSB3012M	Screw	1		
	4	E25334-002	Tray Ass'y	1		
	5	SBSF3014Z	Screw	2		
	6	E304210-002	Fitting	1		
	7	SBSE3008N	Screw	1		
	8	E65923-003	Screw	2		
	9	E73211-001	Cord Holder	1		
	10	SBSE3008M	Screw	5		
⚠	11	QHS3876-162	Cord Stopper	1		Except BS
⚠		QHS3876-162BS	Cord Stopper	1		BS
⚠	12	QMP1200-200	Power Cord	1		J,C
⚠		QMP7600-200	Power Cord	1		U,P,PG
⚠		QMP3900-200	Power Cord	1		E,G,ES
⚠		QMP2560-244	Power Cord	1		A
⚠		QMP9017-008BS	Power Cord	1		BS
	13	See Page 2-5	Mechanaism Ass'y	1		
	14	E48729-007	Plastic Rivet	2		
⚠	15	ELP4101-003	Fuse Lamp	1		
	16	E304209-001	Reflector	1		
	17	E73077-003	Sheet Ass'y	1		
	18	E73076-002	Earth Bracket	1		
	19	E72018-001	Wire Clamp	1		
⚠	20	ETP1020-14JA	Power Transformer	1		J,C
⚠		ETP1020-14MA	Power Transformer	1		U,P,PG
⚠		ETP1020-14EA	Power Transformer	1		E,A,G,ES
⚠		ETP1020-14EABS	Power Transformer	1		BS
	21	E302764-001	Voltage Selector Cover	1		U,P,PG
⚠	22	QSR0085-008U	Voltage Selector	1		U,P,PG
	23	E72393-001	FL Rubber	4		
	24	E73072-001	Foot	4		
	25	E304207-002	Cover	1		
	26	E11278-004	Chassis Base	1		Except J,U,P,PG
		E11278-005	Chassis Base	1		J
		E11278-006	Chassis Base	1		U,P,PG
	27	EFP-XLV220BKE	Front Panel Ass'y	1		
	27-1	E11277-001	Front Panel	1		
	27-2	E73070-001	Cap	1	REPEAT	
	27-3	E73068-001	Window Screen	1		
	27-4	E73071-001	Cap	1	OPEN/CLOSE	
	27-5	E72968-001	JVC Mark	1		
	27-6	E304204-002	Button Ass'y	1		
	28	SBSF3008M	Screw	3		
	29	E72431-003	Knob	1		
	30	E304208-001	Push Shaft	1		
	31	E73073-001	Power Button	1		
	32	E72572-007	Spacer	1		
	33	E73467-001	Cover	1		J,C
	34	GBSE3008CC	Screw	1		
	35	E66052-002	Special Screw	1		
	36	E72634-002	Spacer	1		
	37	E73322-001	Spacer	1		

⚠ : Safety Parts

The Marks for Designated Areas

J	U.S.A.	BS	U.K.
C	Canada	ES	Spain
A	Australia	P,PG	U.S. Military Market
E	Europe	U	Other Countries
G	West Germany	No Mark indicates all areas.	

Mechanism Assembly



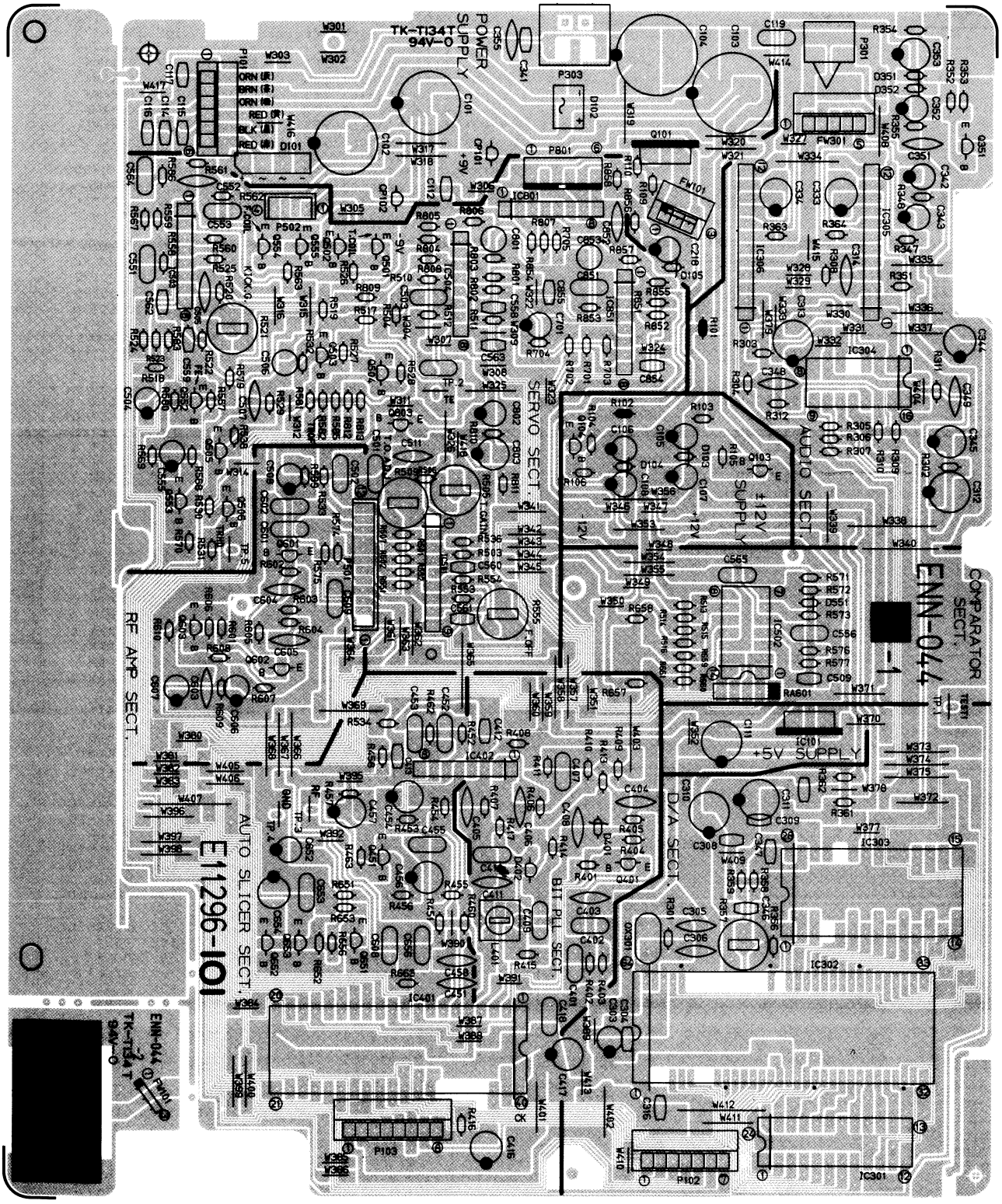
Mechanism Assembly

⚠	Item No.	Parts Number	Parts Name	Q'ty	Description	Areas
	1	E11274-001	Base Ass'y	1		
	2	E304201-001	Holder Ass'y	1		
	3	E70267-003	R Tube	1		
	4	E72376-001	M. Pulley	1		
	5	E69879-002	Belt	2		
	6	E73061-001	Pulley (L)	1		
	7	E72378-001	Gear (X)	1		
	8	E73062-001	Gear (Y)	1		
	9	E25332-001	Main Gear	1		
	10	E303831-003	Lever	1		
	11	E72382-001	Tor. Spring	1		
	12	E72379-001	Turntable	1		
	13	E73060-001	M. Pulley	1		
	14	E73063-001	Pulley (F)	1		
	15	E71731-002	Shaft	2		
	16	E73064-001	Feed Gear (A)	1		
	17	E71967-002	Label	1		
	18	E71569-001	Motor	1		
	19	RF-310T-10470	Motor	1		
	20	RF-260T-08450	Motor	1		
	21	SDSP2604N	Screw	2		
	22	E72963-203	W.H. Screw	2		
	23	E72963-268	W.H. Screw	2		
	24	E65923-004	T. Screw	2		
	25	ESB1200-003	Leaf Switch	1		
	26	QSS1214-002	Slide Push Switch	1		
	27	EWS016-090	SKT Wire Ass'y	1		
	28	EWS015-124	SKT Wire Ass'y	1		
	29	EWS254-B006	SKT Wire Ass'y	1		
	30	OPTIMA-2	Pickup Ass'y	1		
	31	E73066-001	Feed Shaft	1		
	32	SPSP2608Z	Screw	1		
	33	E304203-002	Pickup Base Ass'y	1		
	34	NNS2600Z	Nut	1		
	35	EWS25C-004	SKT Wire Ass'y	1		
	36	E33754-001	Tie Band	1		
	37	E73067-001	Feed Gear (B)	1		
	38	E72024-001	Speed Nut	1		
	39	E60912-001	Speed Nut	2		

Printed Circuit Board Ass'y and Parts List

■ ENN-044□ Main PC Board Ass'y

Note: ENN-044 □ Varies according to the areas employed. See note (1) when placing on order.



Note (1)

P.C. Board Ass'y	Designated Areas
ENN-044 B	Canada, U.S. Military Market, Australia, Europe, West Germany, U.K., Spain, Other Countries
ENN-044 D	U.S.A.

Transistors

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
⚠	Q101	2SD1505(E,F)	SILICON	ROHM	
⚠	Q103	2SC2060(Q,R)	SILICON	ROHM	
⚠	Q104	2SA934(Q,R)	SILICON	ROHM	
	Q351	2SA933(R,S)	SILICON	ROHM	
	Q401	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q451	2SD1302(S,T)	SILICON	MATSUSHITA	
⚠	Q501	2SD400MP(E,F)	SILICON	SANYO	
⚠	Q502	2SB544MP(E,F)	SILICON	SANYO	
	Q503	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q504	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q505	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q506	2SA933(R,S)	SILICON	ROHM	
	Q552	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q553	2SA933(R,S)	SILICON	ROHM	
	Q554	2SD400MP(E,F)	SILICON	SANYO	
	Q555	2SB544MP(E,F)	SILICON	SANYO	
	Q601	2SC535(B,C)	SILICON	HITACHI	
	Q602	2SC458(C,D)	SILICON	HITACHI	
	Q603	2SA1029(C,D)	SILICON	HITACHI	
	Q651	2SA933(R,S)	SILICON	ROHM	
	Q652	2SC1740(R,S)	SILICON	ROHM	
	Q653	2SC1740(R,S)	SILICON	ROHM	
	Q803	2SD1302(S,T)	SILICON	MATSUSHITA	

⚠ : SAFETY PARTS

Ics

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
⚠	IC101	NJM78M05A	I.C.		
	IC301	HM6116ASP-20	I.C.	HITACHI	
	IC302	YM-2601-K	I.C.		
	IC303	PCM54HP	I.C.		
	IC304	BU4053B	I.C.	ROHM	
	IC305	BX7347B	I.C.	ROHM	
	IC306	BX7347B	I.C.	ROHM	
	IC401	YM3811	I.C.		
	IC402	M5219L	I.C.	MITSUBISHI	
	IC501	NJM072S	I.C.		
	IC502	NJM2901N	I.C.		
	IC503	M5218L	I.C.	MITSUBISHI	
	IC504	M5218L	I.C.	MITSUBISHI	
⚠	IC801	STA341M	I.C.		
	IC851	M5218L	I.C.	MITSUBISHI	

⚠ : SAFETY PARTS

Diodes

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
⚠	D101	S1VB20F	SILICON		
⚠	D102	S1WB(A)20	SILICON		
⚠	D103	MTZ13C	ZENER	ROHM	
⚠	D104	MTZ13C	ZENER	ROHM	
⚠	D105	MTZ10C	ZENER	ROHM	
	D351	1SS133	SILICON	ROHM	
	D352	1SS133	SILICON	ROHM	
	D401	MTZ5.1JB	ZENER		
	D402	SVC321-AW	VARICAP	SANYO	
	D701	1SS133	SILICON	ROHM	

⚠ : SAFETY PARTS

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C101	QETB1CM-228M	2200MF	16V	ELECTRO	
	C102	QETB1CM-228M	2200MF	16V	ELECTRO	
	C103	QETB1EM-228	2200MF	25V	ELECTRO	
	C104	QETB1EM-228	2200MF	25V	ELECTRO	
	C105	QETB1EM-476	47MF	25V	ELECTRO	
	C106	QETB1EM-476	47MF	25V	ELECTRO	
	C107	QETB1CM-476	47MF	16V	ELECTRO	
	C108	QETB1CM-476	47MF	16V	ELECTRO	
	C111	QETB0JM-477	470MF	6.3V	ELECTRO	
	C112	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C114	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C115	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C116	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C117	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C118	QETB1CM-107	100MF	16V	ELECTRO	
	C119	QFN81HJ-683	0.068MF	50V	MYLAR	
	C303	QETB1AM-107	100MF	10V	ELECTRO	
	C304	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C305	QCS21HJ-100	10PF	50V	CERAMIC	
	C306	QCS21HJ-100	10PF	50V	CERAMIC	
	C308	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C309	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C310	QETB1CM-227	220MF	16V	ELECTRO	
	C311	QETB1CM-227	220MF	16V	ELECTRO	
	C312	QETB1CM-227	220MF	16V	ELECTRO	
	C313	QETB0JM-227	220MF	6.3V	ELECTRO	
	C314	QCF21HP-103	0.01MF	50V	CERAMIC	
	C316	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C333	QETB1HM-476	47MF	50V	ELECTRO	
	C334	QETB1HM-476	47MF	50V	ELECTRO	
	C335	QFN81HJ-822	8200PF	50V	MYLAR	
	C336	QFN81HJ-822	8200PF	50V	MYLAR	
	C342	QETB1EM-226	22MF	25V	ELECTRO	
	C343	QETB1EM-226	22MF	25V	ELECTRO	
	C344	QETB1CM-107	100MF	16V	ELECTRO	
	C345	QETB1CM-107	100MF	16V	ELECTRO	
	C348	QCS21HJ-100	10PF	50V	CERAMIC	
	C349	QCS21HJ-100	10PF	50V	CERAMIC	
	C351	QCF21HP-103	0.01MF	50V	CERAMIC	
	C352	QETB1EM-106	10MF	25V	ELECTRO	
	C353	QETB1CM-227	220MF	16V	ELECTRO	
	C355	QCS21HJ-471	470PF	50V	CERAMIC	
	C401	QFN81HJ-103	0.01MF	50V	MYLAR	
	C402	QFN81HJ-224	0.22MF	50V	MYLAR	
	C403	QCS21HJ-471	470PF	50V	CERAMIC	
	C404	QCS21HJ-471	470PF	50V	CERAMIC	
	C405	QCF21HP-473	0.047MF	50V	CERAMIC	
	C406	QCS21HJ-100	10PF	50V	CERAMIC	
	C407	QFN81HJ-273	0.027MF	50V	MYLAR	
	C408	QCF21HP-473	0.047MF	50V	CERAMIC	
	C409	QFP81HJ-151	150PF	50V	POLY	
	C410	QFP81HJ-471	470PF	50V	POLY	
	C411	QCF21HP-473	0.047MF	50V	CERAMIC	
	C412	QCZ0202-155	1.5MF		CERAMIC	
	C413	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C416	QETB1HM-475	4.7MF	50V	ELECTRO	
	C417	QETB1CM-476	47MF	16V	ELECTRO	
	C418	QCZ0202-155	1.5MF		CERAMIC	
	C451	QCS21HJ-151	150PF	50V	CERAMIC	
	C452	QFN81HJ-103	0.01MF	50V	MYLAR	
	C453	QCS21HJ-271	270PF	50V	CERAMIC	
	C454	QETB1EM-106	10MF	25V	ELECTRO	
	C455	QFN81HJ-183	0.018MF	50V	MYLAR	
	C456	QETB1HM-475	4.7MF	50V	ELECTRO	
	C457	QETB1EM-106	10MF	25V	ELECTRO	
	C458	QCS21HJ-180	18PF	50V	CERAMIC	
	C501	QFP81HJ-471	470PF	50V	POLY	
	C502	QFP81HJ-471	470PF	50V	POLY	
	C503	QFN81HJ-273	0.027MF	50V	MYLAR	
	C504	QETB1HM-474	0.47MF	50V	ELECTRO	
	C505	QCS21HJ-100	10PF	50V	CERAMIC	
	C506	QEN51HM-225	2.2MF	50V	NON POLE	
	C507	QFN81HJ-393	0.039MF	50V	MYLAR	
	C508	QETB1CM-476	47MF	16V	ELECTRO	
	C509	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C511	QCS21HJ-180	18PF	50V	CERAMIC	
	C551	QFN81HJ-183	0.018MF	50V	MYLAR	
	C552	QCF21HP-102	1000PF	50V	CERAMIC	
	C553	QFN81HJ-104	0.1MF	50V	MYLAR	
	C555	QETB1CM-226	22MF	16V	ELECTRO	
	C556	QFN81HJ-104	0.1MF	50V	MYLAR	
	C558	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C559	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C560	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C561	QCHB1EZ-223	0.022MF	25V	CERAMIC	

⚠ : SAFETY PARTS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C562	QCHB1EZ-223Y	0.022MF	25V	CERAMIC	
	C563	QCHB1EZ-223Y	0.022MF	25V	CERAMIC	
	C601	QFN81HJ-472	4700PF	50V	MYLAR	
	C602	QFN81HJ-472	4700PF	50V	MYLAR	
	C603	QCF21HP-473	0.047MF	50V	CERAMIC	
	C604	QCS21HJ-180	18PF	50V	CERAMIC	
	C605	QCS21HJ-471	470PF	50V	CERAMIC	
	C606	QETB1EM-106	10MF	25V	ELECTRO	
	C607	QETB1CM-476	47MF	16V	ELECTRO	
	C608	QFN81HJ-104	0.1MF	50V	MYLAR	
	C609	QFN81HJ-104	0.1MF	50V	MYLAR	
	C611	QCS21HJ-101	100PF	50V	CERAMIC	
	C652	QETB1CM-107	100MF	16V	ELECTRO	
	C653	QFN81HJ-473	0.047MF	50V	MYLAR	
	C654	QETB1EM-106	10MF	25V	ELECTRO	
	C656	QFN81HJ-224	0.22MF	50V	MYLAR	
	C701	QETB1EM-106	10MF	25V	ELECTRO	
	C801	QEN51HM-225	2.2MF	50V	NON POLE	
	C802	QETB1EM-226	22MF	25V	ELECTRO	
	C803	QETBOJM-227	220MF	6.3V	ELECTRO	
	C851	QFN81HJ-272	2700PF	50V	MYLAR	
	C852	QCS21HJ-221	220PF	50V	CERAMIC	
	C853	QEN51HM-474	0.47MF	50V	NON POLE	
	C854	QCHB1EZ-223Y	0.022MF	25V	CERAMIC	
	C855	QCHB1EZ-223Y	0.022MF	25V	CERAMIC	

⚠ : SAFETY PARTS

Resistors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
⚠	R101	QRZ0077-100	10		FUSIBLE	
⚠	R102	QRZ0077-100	10		FUSIBLE	
	R103	QRD161J-122	1.2K	1/6W	CARBON	
	R104	QRD161J-122	1.2K	1/6W	CARBON	
	R105	QRD161J-121	120	1/6W	CARBON	
	R106	QRD161J-121	120	1/6W	CARBON	
	R109	QRD161J-392	3.9K	1/6W	CARBON	
	R110	QRD161J-121	120	1/6W	CARBON	
⚠	R111	QRZ0061-2R2	2.2		FUSIBLE	D
	R301	QRD161J-105	1M	1/6W	CARBON	
	R302	QRD161J-221	220	1/6W	CARBON	
	R303	QRD161J-104	100K	1/6W	CARBON	
	R304	QRD161J-101	100	1/6W	CARBON	
	R305	QRD161J-472	4.7K	1/6W	CARBON	
	R306	QRD161J-472	4.7K	1/6W	CARBON	
	R307	QRD161J-472	4.7K	1/6W	CARBON	
	R308	QRD161J-124	120K	1/6W	CARBON	
	R309	QRD161J-432	4.3K	1/6W	CARBON	
	R310	QRD161J-432	4.3K	1/6W	CARBON	
	R311	QRD161J-472	4.7K	1/6W	CARBON	
	R312	QRD161J-472	4.7K	1/6W	CARBON	
	R347	QRD161J-271	270	1/6W	CARBON	
	R348	QRD161J-271	270	1/6W	CARBON	
	R351	QRD161J-334	330K	1/6W	CARBON	
	R352	QRD161J-473	47K	1/6W	CARBON	
	R353	QRD161J-103	10K	1/6W	CARBON	
⚠	R354	QRD14CJ-680S	68	1/4W	CARBON	B
	R354	QRD161J-680	68	1/6W	CARBON	D
	R355	QRD161J-684	680K	1/6W	CARBON	
	R361	QRD161J-221	220	1/6W	CARBON	
	R362	QRD161J-221	220	1/6W	CARBON	
	R363	QRD161J-682	6.8K	1/6W	CARBON	
	R364	QRD161J-682	6.8K	1/6W	CARBON	
	R401	QRD161J-123	12K	1/6W	CARBON	
	R402	QRD161J-181	180	1/6W	CARBON	
	R403	QRD161J-182	1.8K	1/6W	CARBON	
	R404	QRD161J-182	1.8K	1/6W	CARBON	
	R405	QRD161J-271	270	1/6W	CARBON	
	R406	QRD161J-182	1.8K	1/6W	CARBON	
	R407	QRV144F-3302	33	1/4W	M.FILM	
	R408	QRV144F-3302	33	1/4W	M.FILM	
	R409	QRD161J-183	18K	1/6W	CARBON	
	R410	QRD161J-562	5.6K	1/6W	CARBON	
	R411	QRD161J-183	18K	1/6W	CARBON	
	R412	QRD161J-471	470	1/6W	CARBON	
	R413	QRD161J-152	1.5K	1/6W	CARBON	
	R414	QRD161J-104	100K	1/6W	CARBON	
	R415	QRD161J-821	820	1/6W	CARBON	
	R416	QRD161J-103	10K	1/6W	CARBON	
	R417	QRD161J-471	470	1/6W	CARBON	
	R451	QRD161J-472	4.7K	1/6W	CARBON	
	R452	QRD161J-184	180K	1/6W	CARBON	
	R453	QRD161J-562	5.6K	1/6W	CARBON	
	R454	QRD161J-103	10K	1/6W	CARBON	
	R456	QRD161J-104	100K	1/6W	CARBON	

⚠ : SAFETY PARTS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R457	QRD161J-103	10K	1/6W	CARBON	
	R458	QRD161J-103	10K	1/6W	CARBON	
	R460	QRD161J-562	5.6K	1/6W	CARBON	
	R462	QRD161J-273	27K	1/6W	CARBON	
	R463	QRD161J-183	18K	1/6W	CARBON	
	R501	QRD161J-183	18K	1/6W	CARBON	
	R502	QRD161J-183	18K	1/6W	CARBON	
	R503	QRD161J-474	470K	1/6W	CARBON	
	R504	QRD161J-681	680	1/6W	CARBON	
	R505	QVZ3518-472	4.7K		VARIABLE	
	R506	QRD161J-272	2.7K	1/6W	CARBON	
	R507	QRD161J-474	470K	1/6W	CARBON	
	R509	QVZ3518-224	220K		VARIABLE	
	R510	QRD161J-223	22K	1/6W	CARBON	
	R511	QRD161J-103	10K	1/6W	CARBON	
	R512	QRD161J-103	10K	1/6W	CARBON	
	R513	QRD161J-562	5.6K	1/6W	CARBON	
	R514	QRD161J-562	5.6K	1/6W	CARBON	
	R515	QRD161J-562	5.6K	1/6W	CARBON	
	R516	QRD161J-562	5.6K	1/6W	CARBON	
	R517	QRD161J-183	18K	1/6W	CARBON	
	R518	QRD161J-155	1.5M	1/6W	CARBON	
	R519	QRD161J-183	18K	1/6W	CARBON	
	R520	QRD161J-154	150K	1/6W	CARBON	
	R521	QVZ3518-472	4.7K		VARIABLE	
	R522	QRD161J-472	4.7K	1/6W	CARBON	
	R523	QRD161J-474	470K	1/6W	CARBON	
	R524	QRD161J-474	470K	1/6W	CARBON	
	R525	QRD161J-163	16K	1/6W	CARBON	
	R526	QRD161J-470	47	1/6W	CARBON	
	R527	QRD161J-104	100K	1/6W	CARBON	
	R528	QRD161J-104	100K	1/6W	CARBON	
	R529	QRD161J-102	1K	1/6W	CARBON	
	R530	QRD161J-183	18K	1/6W	CARBON	
	R531	QRD161J-104	100K	1/6W	CARBON	
	R532	QRD161J-122	1.2K	1/6W	CARBON	
	R533	QRD161J-272	2.7K	1/6W	CARBON	
	R534	QRD161J-181	180	1/6W	CARBON	
	R536	QRD161J-114	110K	1/6W	CARBON	
	R551	QRD161J-392	3.9K	1/6W	CARBON	
	R552	QRD161J-392	3.9K	1/6W	CARBON	
	R553	QRD161J-274	270K	1/6W	CARBON	
	R554	QRD161J-224	220K	1/6W	CARBON	
	R555	QVZ3518-104	100K		VARIABLE	
	R557	QRD161J-102	1K	1/6W	CARBON	
	R558	QRD161J-393	39K	1/6W	CARBON	
	R559	QRD161J-471	470	1/6W	CARBON	
	R560	QRD161J-333	33K	1/6W	CARBON	
	R561	QRD161J-822	8.2K	1/6W	CARBON	
	R562	QRD161J-154	150K	1/6W	CARBON	
	R563	QRD161J-470	47	1/6W	CARBON	
	R567	QRD161J-125	1.2M	1/6W	CARBON	
	R568	QRD161J-470	47	1/6W	CARBON	
	R569	QRD161J-473	47K	1/6W	CARBON	
	R570	QRD161J-272	2.7K	1/6W	CARBON	
	R571	QRD161J-472	4.7K	1/6W	CARBON	
	R572	QRD161J-104	100K	1/6W	CARBON	
	R573	QRD161J-562	5.6K	1/6W	CARBON	
	R574	QRD161J-564	560K	1/6W	CARBON	
	R575	QRD161J-564	560K	1/6W	CARBON	
	R576	QRD161J-104	100K	1/6W	CARBON	
	R577	QRD161J-562	5.6K	1/6W	CARBON	
	R579	QRD161J-104	100K	1/6W	CARBON	
	R580	QRD161J-103	10K	1/6W	CARBON	
	R581	QRD161J-103	10K	1/6W	CARBON	
	R582	QRD161J-183	18K	1/6W	CARBON	
	R583	QRD161J-155	1.5M	1/6W	CARBON	
	R585	QRD161J-183	18K	1/6W	CARBON	
	R589	QRD161J-822	8.2K	1/6W	CARBON	
	R601	QRD161J-183	18K	1/6W	CARBON	
	R602	QRD161J-272	2.7K	1/6W	CARBON	
	R603	QRD161J-391	390	1/6W	CARBON	
	R604	QRD161J-221	220	1/6W	CARBON	
	R605	QRD161J-152	1.5K	1/6W	CARBON	
	R606	QRD161J-561	560	1/6W	CARBON	
	R607	QRD161J-561	560	1/6W	CARBON	
	R608	QRD161J-562	5.6K	1/6W	CARBON	
	R609	QRD161J-152	1.5K	1/6W	CARBON	
	R610	QRD161J-271	270	1/6W	CARBON	
	R611	QRD167J-471	470	1/6W	CARBON	
	R651	QRD161J-103	10K	1/6W	CARBON	
	R652	QRD161J-272	2.7K	1/6W	CARBON	
	R653	QRD161J-101	100	1/6W	CARBON	
	R656	QRD161J-271	270	1/6W	CARBON	
	R657	QRD161J-103	10K	1/6W	CARBON	

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R658	QRD161J-562	5.6K	1/6W	CARBON	
	R659	QRD161J-103	10K	1/6W	CARBON	
	R660	QRD161J-682	6.8K	1/6W	CARBON	
	R661	QRD161J-103	10K	1/6W	CARBON	
	R663	QRD161J-471	470	1/6W	CARBON	
	R701	QRD161J-563	56K	1/6W	CARBON	
	R702	QRD161J-563	56K	1/6W	CARBON	
	R703	QRD161J-104	100K	1/6W	CARBON	
	R704	QRD161J-104	100K	1/6W	CARBON	
	R705	QRD161J-470	47	1/6W	CARBON	
	R801	QRD161J-184	180K	1/6W	CARBON	
	R802	QRD161J-274	270K	1/6W	CARBON	
	R803	QRD161J-123	12K	1/6W	CARBON	
	R804	QRD161J-184	180K	1/6W	CARBON	
	R805	QRD161J-562	5.6K	1/6W	CARBON	
	R806	QRD161J-392	3.9K	1/6W	CARBON	
	R807	QRD161J-470	47	1/6W	CARBON	
	R808	QRD161J-103	10K	1/6W	CARBON	
	R809	QRD161J-182	1.8K	1/6W	CARBON	
	R810	QRD161J-821	820	1/6W	CARBON	
	R811	QRD161J-184	180K	1/6W	CARBON	
	R812	QRD161J-183	18K	1/6W	CARBON	
	R813	QRD161J-273	27K	1/6W	CARBON	
	R851	QRD161J-684	680K	1/6W	CARBON	
	R852	QRD161J-684	680K	1/6W	CARBON	
	R853	QRD161J-104	100K	1/6W	CARBON	
	R854	QRD161J-470	47	1/6W	CARBON	
	R855	QRD161J-563	56K	1/6W	CARBON	
	R856	QRD161J-473	47K	1/6W	CARBON	
	R857	QRD161J-472	4.7K	1/6W	CARBON	
	R858	QRD161J-2R2	2.2	1/6W	CARBON	
	RA601	QRB045J-472	4.7K	4W	ARRAY	

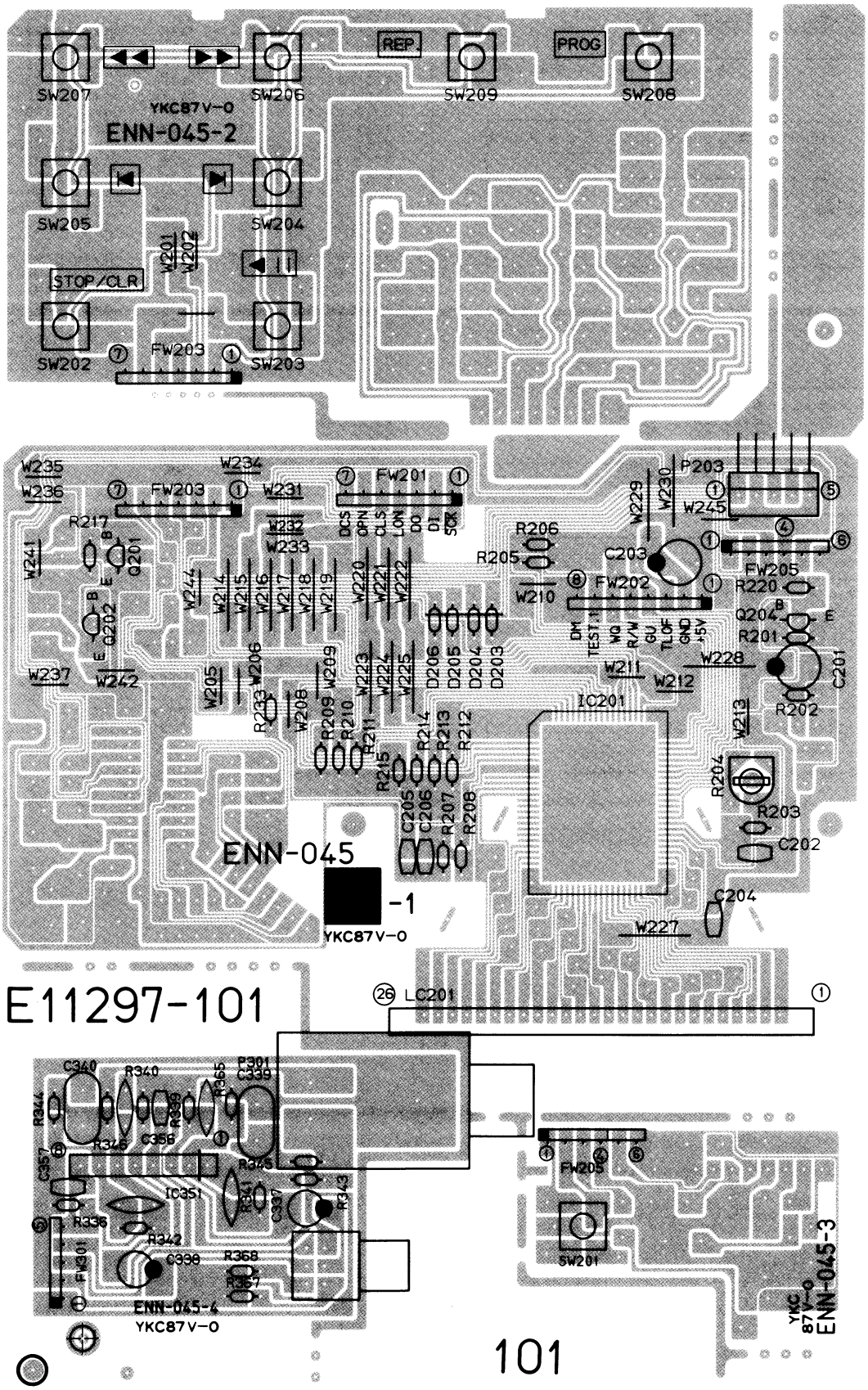
⚠ : SAFETY PARTS

Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		EWT011-078	TERMINAL WIRE	
		E11296-101	CIRCUIT BOARD	
		E45524-002	FUSE CLIP	
		PH-0125-M		
	L401	ENZ3001-002	OSCCOIL	
	P101	EMV7112-006	SOCKET	
	P102	EMV7112-007	SOCKET	
	P103	EMV7112-008	SOCKET	
	P301	EMN00TV-201A	PIN JACK ASSY	
	P303	QMS3533-001	JACK ASSY	
	P304	EMV7112-005	SOCKET	
	P501	EMV5109-012A	12P PLUG	
	P502	EMV5109-004A	4P PLUG	
	P801	QMV5005-006K	PULAG ASSY	
⚠	CP101	ICP-N20	IC PROTECTOR	
⚠	CP102	ICP-N20	IC PROTECTOR	
	OS301	ECX0086-436ECT	X'TAL	

⚠ : SAFETY PARTS

■ ENN-045B Front PC Board Ass'y



Transistors

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	Q201	DTC144EN	SILICON	ROHM	
	Q202	DTA114YN	SILICON	ROHM	
	Q204	2SA933(R,S)	SILICON	ROHM	

⚠ : SAFETY PARTS

ICs

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	IC201	UPD7514G-209-12	I.C.	NEC	
	IC201	UPD7514G-180	I.C.		
	IC351	M5218L	I.C.	MITSUBISHI	

⚠ : SAFETY PARTS

Diodes

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	D203	1SS133	SILICON	ROHM	
	D204	1SS133	SILICON	ROHM	
	D205	1SS133	SILICON	ROHM	
	D206	1SS133	SILICON	ROHM	
	D211	1SS133	SILICON	ROHM	

⚠ : SAFETY PARTS

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C201	QETB1AM-476	47MF	10V	ELECTRO	
	C202	QCSB1HJ-470	47PF	50V	CERAMIC	
	C203	QETB1AM-476	47MF	10V	ELECTRO	
	C204	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C205	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C206	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C337	QETB1HM-105	1MF	50V	ELECTRO	
	C338	QETB1HM-105	1MF	50V	ELECTRO	
	C339	QFN81HJ-103	0.01MF	50V	MYLAR	
	C340	QFN81HJ-103	0.01MF	50V	MYLAR	
	C356	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C357	QCHB1EZ-223	0.022MF	25V	CERAMIC	

⚠ : SAFETY PARTS

Resistors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R201	QRD161J-152	1.5K	1/6W	CARBON	
	R202	QRD161J-332	3.3K	1/6W	CARBON	
	R203	QRD161J-303	30K	1/6W	CARBON	
	R204	QVZ3518-472			VARIABLE	
	R205	QRD161J-333	33K	1/6W	CARBON	
	R206	QRD161J-333	33K	1/6W	CARBON	
	R207	QRD161J-103	10K	1/6W	CARBON	
	R208	QRD161J-103	10K	1/6W	CARBON	
	R209	QRD161J-472	4.7K	1/6W	CARBON	
	R210	QRD161J-472	4.7K	1/6W	CARBON	
	R211	QRD161J-472	4.7K	1/6W	CARBON	
	R212	QRD161J-473	47K	1/6W	CARBON	
	R213	QRD161J-473	47K	1/6W	CARBON	
	R214	QRD161J-473	47K	1/6W	CARBON	
	R215	QRD161J-473	47K	1/6W	CARBON	
	R217	QRD161J-472	4.7K	1/6W	CARBON	
	R220	QRD161J-103	10K	1/6W	CARBON	
	R233	QRD161J-392	3.9K	1/6W	CARBON	
	R235	QRD148J-102S	1K	1/4W	CARBON	
	R339	QRD161J-473	47K	1/6W	CARBON	
	R340	QRD161J-473	47K	1/6W	CARBON	
	R341	QRD161J-473	47K	1/6W	CARBON	
	R342	QRD161J-473	47K	1/6W	CARBON	
	R343	QRD161J-680	68	1/6W	CARBON	
	R344	QRD161J-680	68	1/6W	CARBON	
	R345	QRD161J-390	39	1/6W	CARBON	
	R346	QRD161J-390	39	1/6W	CARBON	
	R365	QRD161J-223	22K	1/6W	CARBON	
	R366	QRD161J-223	22K	1/6W	CARBON	
	R367	QRD161J-561	560	1/6W	CARBON	
	R368	QRD161J-561	560	1/6W	CARBON	
	VR351	QVAB99A-E54B	50K		VARIABLE	

⚠ : SAFETY PARTS

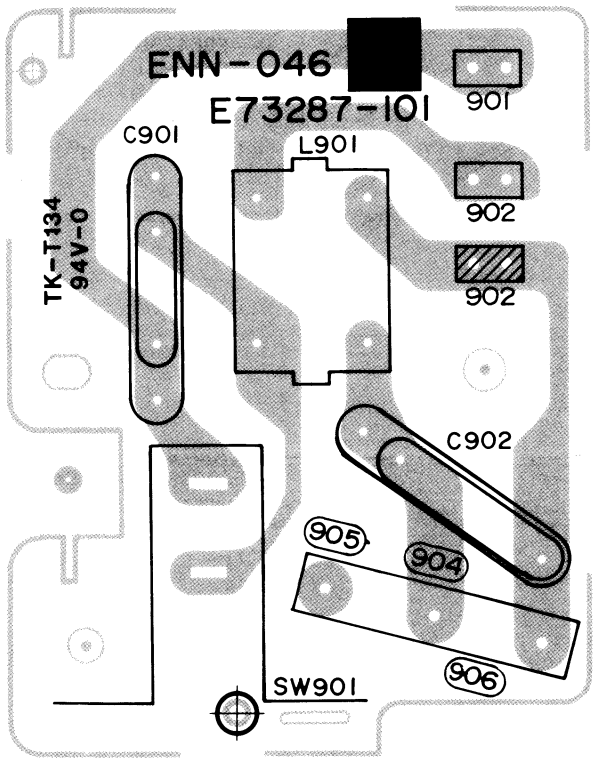
Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		E11297-101	CIRCUIT BOARD	
	P201	QMV5004-005K	PULAG ASSY	
	P301	QMS6302-128	JACK ASSY	
	LC201	ELU0002-020	F.L.TUBE	
	SW201	ESP0001-007	PUSH SWITCH	
	SW202	ESP0001-007	PUSH SWITCH	
	SW203	ESP0001-007	PUSH SWITCH	
	SW204	ESP0001-007	PUSH SWITCH	
	SW205	ESP0001-007	PUSH SWITCH	
	SW206	ESP0001-007	PUSH SWITCH	
	SW207	ESP0001-007	PUSH SWITCH	
	SW208	ESP0001-007	PUSH SWITCH	
	SW209	ESP0001-007	PUSH SWITCH	

⚠ : SAFETY PARTS

■ ENN-046□ Primary PC Board Ass'y

Note: ENN-046 □ Varies according to the areas employed. See note (1) when placing on order.



Note (1)

PC Board Ass'y	Designated Areas
ENN-046 A	U.S.A.,Canada
NN-046 B	U.S. Military Market & Other Countries
NN-046 C	Europe, Australia Spain & West Germany
NN-046 D BS	U.K.

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
⚠	C901	QCZ9018-103	0.01MF		CERAMIC	B
⚠	C901	QCZ9038-103	0.01MF		CERAMIC	A
⚠	C901	QCZ9038-103	0.01MF		CERAMIC	C
⚠	C901	QCZ9038-103BS	0.01MF		CERAMIC	DBS
⚠	C902	QFZ9010-223	0.022MF		MYLAR	C
⚠	C902	QFZ9019-223	0.022MF		MYLAR	A
⚠	C902	QFZ9020-223	0.022MF		MYLAR	B
⚠	C902	QFZ9020-223BS	0.022MF		MYLAR	DBS

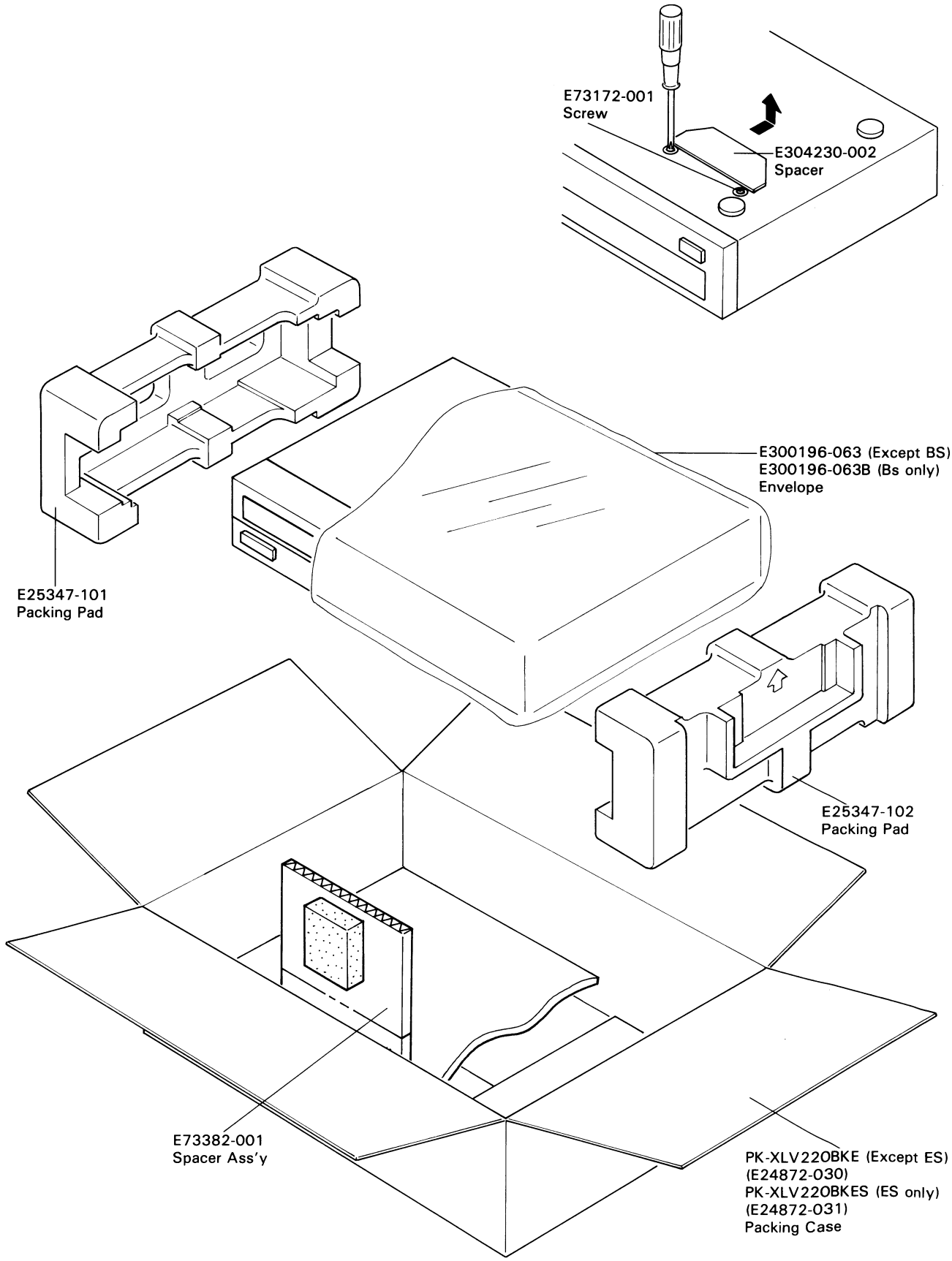
⚠ : SAFETY PARTS

Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		E65508-002	TAB	
		E67764-203	TERMINAL ASS'Y	
		E73287-101	CIRCUIT BOARD	A
		E73287-101	CIRCUIT BOARD	B
		E73287-101	CIRCUIT BOARD	C
		E73287-101BS	CIRCUIT BOARD	DBS
⚠		QSP1106-004	PUSH SWITCH	A
⚠		QSP1106-004	PUSH SWITCH	B
⚠		QSP1106-004	PUSH SWITCH	C
⚠		QSP1106-004BS	PUSH SWITCH	DBS
⚠	L901	ENZ5002-004	LINE FILTER	A
⚠	L901	ENZ5002-004	LINE FILTER	B
⚠	L901	ENZ5002-004	LINE FILTER	C
⚠	L901	ENZ5002-004BS	LINE FILTER	DBS

⚠ : SAFETY PARTS

Packing Materials and Part Numbers



Accessories List

⚠	Part Number	Part Name	Description	Areas
	E30580-1326A	Instruction Book		Except BS
	E30580-1326ABS	Instruction Book		BS
	BT20047C	Warranty Card		J,P,PG
	BT20025H	Warranty Card		C
	BT20029C	Warranty Card		A
	BT20060	Warranty Card		BS
	BT20064	Warranty Card		G
	BT20046B	Service Information		J
	BT20044E	Safety Instruction Sheet		J,P,PG
	BT20071A	Service Center		C
	BT20066	EEC Agency		BS,G
	E35497-017	Caution Sheet	110 V	P
	E35497-019	Caution Sheet	220 V	U,PG
⚠	E04056	Siemens Plug		U,PG
	E70570-001	Keeping Card		J
	E70571-001	Keeping Card		J
	E70572-001	Keeping Card		J
	A76332-2	Keeping Card		J
	EWP302-101	Signal Cord	for Output	
	EWP805-001	1P Plug Cord	for DCS	
	E66416-003	Envelope	for Warranty Card	J
	E41202-004	Envelope		U,PG
	E300196-010	Envelope	for Instruction Book	Except BS
	E300196-010B	Envelope	for Instruction Book	BS

⚠ : Safety Parts

The Marks for Designated Areas			
J	U.S.A.	BS	U.K.
C	Canada	ES	Spain
A	Australia	P,PG	U.S. Military Market
E	Europe	U	Other Countries
G	West Germany	No Mark indicates all areas.	